The Builder.

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Further Notes on Yorkshire Stone (Halifax District).

IN our issue of March 29 we gave a general account of the groups of quarries, and of the kinds of stone which they supplied. In addition to the information conveyed in our last article respecting flags, &c., it may be well to distinguish the meaning of the two terms so frequently used, "self-faced" and "self-bedded." These ought not to be confounded; the latter is applied to "thin-lift" stone with micaceous faces; the former refers primarily to material which happens to come away from a mass of riving rock with a moderately even surface. The term "self-faced" is, however, frequently used to include "self-bedded," but "self-bedded" ought never to be employed to mean "self-faced." The two kinds of material are usually classed together, and are often sold under the name of "common" flags or landings; they do not, however, wear equally well, nor do they present the same appearance. The self-bedded flags, with their micaceous faces, are sometimes almost as smooth as if polished, and when laid form floors of commendable evenness; their appearance is certainly in their favour, but an examination of the edge of the flag will show that the lines of lamination are very marked, being sometimes almost black. Sometimes the edge of the stone has been "stunned" by the blows received during the operation of squaring, and the flag will be seen to gape at several of the more pronounced mica-streaks. A flag of this kind 2 or 3 in. thick can often be split into three or four slates with surfaces partly "white" and partly "black." In any case, the tendency of self-bedded flags is to wear in flakes. On the contrary, self-faced flags have a rougher surface, and require, as a rule, a certain amount of labour to be expended in taking them out of twist before they can be laid to form a floor of tolerable evenness; but their less flaky nature more than counterbalances these disadvantages, if durability be any object. Frost is a very powerful agent in the destruction of flags, especially self-bedded ones; if the stone is of a flaky nature, frost will find it out. The only thing to do under the circumstances is to keep the joints of the flagging well pointed with cement, renewing it as often as necessary; but this will only mitigate the effects of the frost,—it will not render the flags proof against it. Architects and surveyors are largely to blame for not insisting on having flags squared "full" throughout their thickness. We know of one or two Vestries in London whose Surveyors insist on this with good results; it is the best plan for public bodies to buy flags, &c., directly of the quarry-owners, and to have them squared and laid by their own workmen.

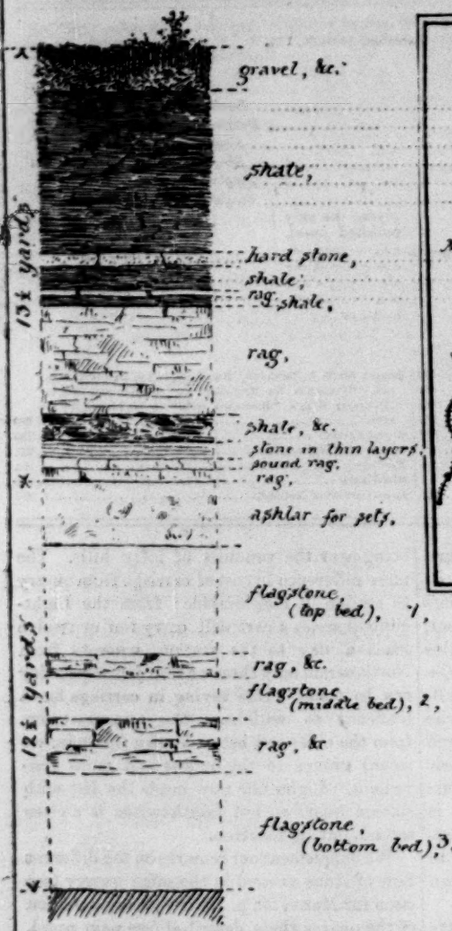
We have heard it stated that polished flags are obtained from stone of worse quality than that used for tooling; in fact, that "anything is good enough to polish." This is not true of the polished material now sent from the district of which we are writing; it is true, however, of *some* of the Lancashire quarries. In these, the "rag" is polished and wears very unevenly, while frost will burst fragments off the face of the stone; in addition to this, polished flags of this ragstone (which cannot easily be split) are sent with scarcely an approximation to the thickness ordered; a "three-inch" flag means anything from 3 in. to 6 in. or 7 in., and this excess entails not only a considerable increase in cost of carriage, but also more labour in laying. Only the best beds in the Halifax quarries supply the stone for polishing; never, we believe, are self-bedded flags placed in the polishing machines.

A new departure, which we watch with interest, has recently been taken by one of the principal firms of the district; we refer to the practice of branding with a certain name every polished flag, landing, and step which is found to be of the best quality.

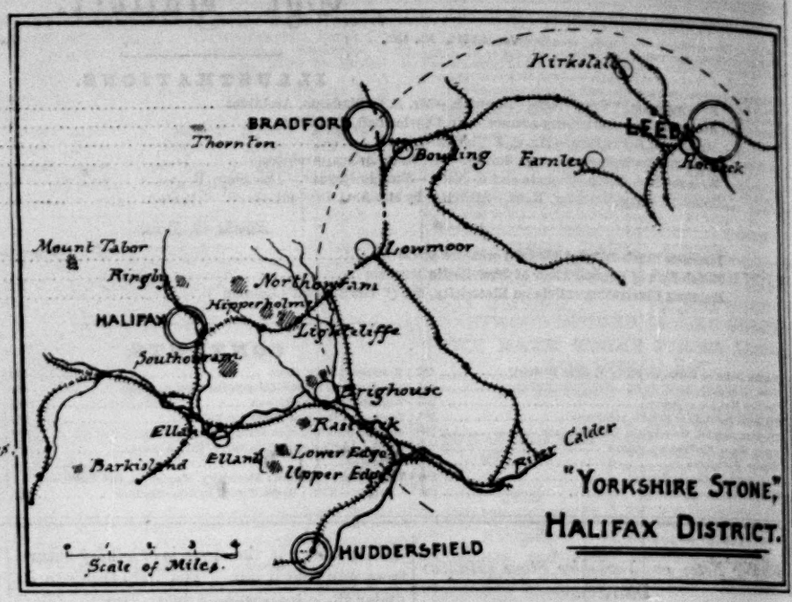
We give a small map of part of Yorkshire, showing the position of the several groups of quarries in the neighbourhood of Halifax. The dotted semi-circle roughly indicates the boundary of the stone district, and encloses the ironworks of Lowmoor, Bowling, Kirkstall, Holbeck, and Farnley, and also a number of coal-pits. It will be noticed that the quarries at Hipperholme, Lightcliffe, Brighouse, and Rastrick are situated near the railways, whereas the older quarries at Northowram, Southowram, and Elland Edge are further removed. The three last-named have also the disadvantage of being near the summits of lofty hills. The mere difference in cost of carriage from quarry to station is considerable; from the Lightcliffe quarries a cart will carry ten or twelve loads a day to the station, whereas from Northowram only three or four journeys a day can be made. This saving in carriage has a tendency to withdraw the quarry-owners from the older and better-known (in *books*, we mean) groups to the newer and more convenient. Lightcliffe now heads the list with sixteen quarries, but Southowram is a close second, having fourteen.

We supplement our remarks on the different beds of stone worked in the same quarry (see issue for March 29, p. 222) by giving a section of the quarry there described (see next page). It will convey a better idea of the strata than a verbal description. From 6-in. cubes of stone from the three principal beds we have ascertained the weights to be as follows:—Top bed, 151½ lbs. per cubic foot; middle bed, 150½ lbs.; and bottom bed, 150½ lbs. It is difficult to distinguish the stones when dry; but if the stones are wetted and then examined, it will be found that the stone from the top bed is very closely striated throughout its entire thickness (not, however, with streaks of mica); that in the middle bed the lines of lamination are less distinct; and that in the bottom bed the natural bed of the stone is not discernible, but there are a number of minute reddish-brown specks scattered throughout the stone. It is considered that this absence of beddiness in the last more than counterbalances its slightly less weight. It should be stated that some of the Lightcliffe quarries contain only two beds of stone, and some only one, even though they are within fifty yards of the one illustrated.

We have preferred to treat of the quarries in groups, and have endeavoured to show in some sort the features which the several members of each group have in common, but an intimate acquaintance with the subject shows us that almost every quarry, however near it may be to others, has some distinctive feature of its own. In the mere quantity of marketable stone the difference is very great; for instance, at Lane Head, Brighouse, in the two contiguous pits belonging to Messrs. S. & I. Cliffe respectively, the stratum is about 7 ft. thick, the lowest 3 ft. of this being "thin-lift" or "self-bedded" stone and the remaining 4 ft. being "thick-lift" or "riving" stone; at Swallow's quarry on the opposite side of the



Section of Yew-Tree Quarry, LIGHTCLIFFE.



In a stone-mine — propping the roof.

Halifax-road (perhaps 50 yards away) the bed of stone is about 9 ft. thick, but the "thin-lift" has dwindled to 2 ft. Again, in the field adjoining his present quarry Mr. S. Cliffe sank several shafts, and in addition to the bottom bed 40 yards from the surface, he found and quarried at half that depth an upper stratum about 5 ft. thick; on trying this top bed in his present shaft he found that it had thinned out to about 18 in. and was not worth working.

Immediately beyond this most fortunate field he purchased a triangular plot of ground, but the shaft he sank in it proved quite unremunerative, for the stone, on account of oblique lamination or some primeval catastrophe, was found to be broken up into almost worthless fragments. About 200 yards distant (in Lightcliffe-road) J. Roper & Sons mine a bed of stone 19 ft. in thickness, and Farrars, Limited, at their vast open quarries utilise 33 ft. of stone.

Midway between the quarries at Rastrick and Lower Elland Edge, a shaft was lately sunk to the depth of 48 yards, but the stone was nearly all worthless; not only was it unevenly bedded, but it was also broken into small pieces, and cracked perpendicularly to the planes of bedding.

Besides the difference in quantity and lamination, there is also a considerable variety in colour, even in the same quarry and the same block of stone. At Lane Head, Brighouse, all the stone is light brown or yellow; at Lightcliffe-road there is a considerable quantity of "blue" stone, the colour showing the presence of iron. A block of stone is frequently "blue" in the middle, with an outer portion grey or white.

From these remarks it will be seen that there may be exceptions to the general conclusions which are here stated respecting the several groups of quarries. For all large works the architect or engineer ought to see for himself the state of the quarry proposed to be selected, besides obtaining and testing proper specimens of the stone.

In addition to the materials already mentioned, an extensive trade is carried on in what are termed "flat-bedded wallstones." A considerable quantity of "inside wallstones" are used in the immediate neighbourhood of the quarries, but not many of these are sent away by train. There is, however, a great and increasing demand for "outside wallstones," chiefly in the West Riding of Yorkshire, in Lancashire, and in the adjoining counties; several consignments have been delivered in London and suburbs for churches and halls.

The wallstones are obtained (by splitting with wedges and cutting with chisel and hammer) from the larger fragments which are cut off for the purpose of squaring the blocks of flagstones and landings, and also from those pieces of rock which are not of suitable shape and size for splitting into flags. They are usually 6 in. on the bed, but larger sizes are cut to order. Their thickness varies from 2½ in. to 6 in, and their length approximately from 9 in. to 2 ft. 6 in. It would be better, however, if wallstones of less than 3 in. thick were rejected, as they are frequently obtained from self-bedded material. Usually these wallstones are specified to be squared back from the face 3 in., and to be walled in courses of diminishing thickness from bottom to top of the building. This last is a point of considerable importance, and ought to be strictly observed, for the sake of appearance. The two kinds always in the market are known as "pitched-face" (sometimes termed "rock-face"), and "straight-face" (also variously known as "common outside," "hammer-dressed," and "delf-dressed," but the last is certainly a misnomer, as the "pitched-face" wallstones are quite as much delf-dressed,—that is to say, quarry-dressed,—as are the "straight-face"). The epithet "pitched-face" quite sufficiently describes the rough surface of the first-class stones; the term "straight-face" is also explicit enough with this addition, —wallstones of this class always have upon their faces a number of hammer-marks vertical but irregularly spaced, varying in part according to the evenness or unevenness of the face-fracture. Those wallstones which present a perfectly even face after cleavage are sometimes left free from hammer-marks and sold at a slightly higher price as "clean-cut." Sometimes these clean-cut wallstones have a small chamfer taken off the edges, and are then sold as "slight-pitched;" they have a good appearance, and do not harbour dirt and moisture to the same extent as ordinary pitched-face wallstones. For the best work tooled wallstones are often used, but the tooling is usually done upon the building site itself, selected "straight-face" wallstones being the kind obtained from the quarries for the purpose; on account of the hardness of the stone, the cost of tooling is very great. In some parts of Lancashire, it may be stated, the generic name "Yorkshire parpoints" is used to designate this kind of building-stone. By far the greatest number of buildings erected in and around Halifax at the present time, are faced with flat-bedded wallstones of one or other of these classes. Sometimes the front or front and sides of a building will be faced with "pitched-face" wall-

Table of information respecting the principal groups of "Yorkshire Stone" Quarries in the neighbourhood of Halifax.

Situation of Quarries.	Miles from.	Nearest Railway Station.	Approximate number of Quarries.	Method of Working, &c.	Some of the Owners.	Colour.	Output.	Weight per cubic foot.	Remarks.
								lbs.	
1. Northowram ...	1½	Hipperholme.	9	Open and mined, the latter 23 yards from surface.	Joseph Brooke & Sons, Appleyard & Booth, Haley, Brearley, Briggs & Holmes, Wharton.	"Blue" and white, and also light yellow.	All kinds of flags and landings, but chiefly knotted and tooled (J. B. & S. supplying the only polished ones), sets, curbs, steps, slates (chiefly riven), wallstones, footings, &c.	155·5 "Blue" Park-stone.	The quarries are situate on the top of the steep and lofty hill, on the lower portion of which Hipperholme and Lightcliffe stand. The wallstones are sorted into two classes, and sold as "best white" and "blue and white," the latter presenting both colours in the same stone. The flags enjoy a good reputation for durability, the "blue" variety, from Park Quarries, being especially hard and heavy. The stone is nearly all "riving," or "thick-lift" stone. The "blue" stone has been tested and used for chemical cisterns, and can be obtained any size up to 14 ft. by 9 ft. by 2 ft.
2. Hipperholme ... (Pearson Brow)	½	Hipperholme.	5	Open, about 22 yards from surface.	J. Brooke & Sons, Shepherd & Bentley, Smith, Aspinall, Mackrill.	"White," really very very light grey, or greyish-white.	Ditto.	152	The quarries (especially the ones at Stubbins, belonging to the two first-named owners) supply the best *white* wallstones in the district. Sometimes the stone is sold mixed with Northowram stone, and further confusion arises because the two groups despatch their stone from the same station. The "blue" stone put into trucks at Hipperholme is almost invariably from Northowram. The stone is nearly all riving stone.
3. Lightcliffe ... (Hill Top)	½	Lightcliffe.	13	Open, about 15 yards from surface.	J. Brooke & Sons, Shepherd & Bentley, Turner, Bentley, Crowther & Lodge, Walker & Co., Naylor, Cliffe, Blackburn & Co.	Light warm grey, (sold frequently as "white," but the colour is not as pure and uniform as Hipperholme stone).	Ditto, and also platform copings, and landings for chemical cisterns up to 12 ft. square.	150·76*	The bottom bed, found in some of these quarries, does not when wet show the lines of lamination. Selected stone from this and the preceding groups is polished by J. B. & S., at their Yew Tree Quarry, and stamped "Silex brand." The stone is nearly all riving stone.
4. Lightcliffe ... (Harley Head)	½	Hipperholme, Lightcliffe.	3	Mined about 20 yds. from surface.	Butterfield, Naylor, Goodyear.	Ditto.	Chiefly knotted and tooled flags, sets, curbs, wallstones, &c.	—	The stone is very similar to that at Hill Top, Lightcliffe.
5. Southowram ...	2	Halifax or Elland.	14	Ditto.	John Farrar & Sons, J. Charnock & Sons, S. Greenwood, Smith & Greenwood, Marshall & Greenwood. J. Thompson, A. Twait, Thornton, Clegg & Bartle, Maude & Denham.	Light grey ...	All kinds of flags landings, a considerable quantity of *self-bedded* slates, flags, and landings; sets, curbs, steps, wallstones, footings.		Self-bedded material, with very smooth micaceous surfaces, and riving stone, are obtained at these quarries. J. Charnock & Sons have a polishing machine at Halifax, and J. Farrar & Sons one at Brookfoot, near Brighouse, and another at Thornton.
6. Brighouse (Lane Head).	¾	Brighouse.	4	Mined, about 40 yards from surface.	Samuel Cliffe, Isaac Cliffe, Thornton Cookson & Ellis, Swallow.	Light brown or light yellow.	All kinds of flags and landings (except polished), a large quantity of *self-bedded* slates, flags, and landings, a few sets curbs and steps, wallstones.		The wallstones are of good and uniform colour (especially the Cliffe's). The riving (very hard) and self-bedded (smooth) stones are in nearly equal quantities.
7. Brighouse (Lightcliffe-road).	¾	Brighouse.	6	Open and mined, 30 to 40 yards from surface.	Farrars Limited, Marshall, John Roper & Sons, Longbottom & Barker, Robinson.	Light grey or "white," and "blue."	Ditto, footings, and landings for chemical cisterns, tooled platform copings, tooled street-curbs, &c.	154	Some of the wallstones are variegated "blue" and "white." Self-bedded and riving stone are nearly equal in quantity — landings have been sent off containing 152 square feet.
8. Rastrick	¾	Brighouse.	8	Mined, about 35 yards from surface.	Bentley & Kaye, Bentley & Smith, Sunderland, Clayton, Sheffield, Jagger.	Light, warm grey, (a little blue).	All kinds of flags and landings (except polished), not many self-bedded; a few sets, curbs, steps; wallstones.		Nearly all riving stone.

* Mean of four weights, namely, Yew Tree Quarry, top bed, 151·5; middle bed, 150·8; bottom bed, 150·6; and Gaubert Hall Quarry, 150·14.

Table of information, &c.—continued.

Situation of Quarries.	Miles from	Nearest Railway Station.	Approximate number of Quarries.	Method of Working, &c.	Some of the Owners.	Colour.	Output.	Weight per cubic foot.	Remarks.
9. Elland Lower Edge	2	Brighouse.	4	Open, about 20 yards from surface.	Marshall & Walker, Normanton & Gledhill, John Wood & Co.	Light brown.	Sets almost exclusively; a few self-faced flags and slates; curbs, steps, footings.	lbs. 153½	Practically all riving stone. Sometimes the sets are used as wallstones or heavy retaining walls.
10. Elland Upper Edge	2½	Brighouse.	10	Open and mined, one of the latter 43 yards from surface.	F. Normanton, Walker & Brook, Rawnsley & Spencer.	Ditto.	Ditto.	153½	Ditto.
					Marshall & Walker, Paul Normanton & Co., Richard Marsden, James Marsden.	Ditto.	Shoddy and self-bedded flags and landings (none tooled or polished); a few sets, steps, curbs, footings, and wallstones.		Almost exclusively a bedded stone with smooth faces; landings up to 130 square feet.
11. Barkisland ...	1½	Ripponden	3	Open	Crowther & Lumb ...	Ditto, but slightly darker.	Sets, flags, curbs, wallstones.		This is not as important a group as the ones previously mentioned; Mr. S. Cliffe, of Brighouse, has just stopped working a quarry here. The wallstones are not very uniform in colour.

stones, and the remainder, for the sake of economy, with straight-face. But there is not now as great a difference in the price of the two kinds as there was about ten years ago; then the pitched-face stones were ten shillings a rood more than the other, whereas one or two years ago, on account of the increased demand for straight-face ones, the prices were equalised, and now the straight-face have again fallen below the other. The difference in price between the two may be taken as 6s. per rood, that being the difference in the cost of dressing at the quarries. A rood of wallstones is 14 square yards, the stones being set up at the quarries in eight rows, 5 ft. 3 in. long and 3 ft. high. In each rood of wallstones a number of "throughs" are included, not exceeding one per yard; these, of course, vary on the bed according to the thickness of the wall for which they are required. Except near the quarries, where inside wallstones are easily attainable, the external stone-faced walls of buildings are lined with brick, and the general mode of tying the two parts of the wall together is by these throughstones. Where the internal brickwork is to remain unplastered, iron ties are frequently used, or the inner faces of the throughstones are dressed. If the brick lining is 9 in. thick, sometimes, instead of throughs, *bondstones* are used, reaching over one-half of the brick lining, this being bonded with the other half by ordinary brick headers.

The chief causes of the so general use of these wallstones in the locality are their durability and substantial appearance when compared with brickwork, and their economy in comparison with wrought ashlar. Like bricks, they are delivered upon the building site ready for use, the only working required being for the formation of the necessary headers for the angles of the building and the reveals of doors and windows. The external angles of pitched-face headers are almost invariably draughted about an inch wide on the front and return faces, and straight-face angles are also sometimes treated in the same way. It may be interesting for a moment to compare the prices current in the district for various kinds of walls. A solid brick-and-a-half wall costs 7s. a yard; a wall of the same thickness built with straight-face wallstones, 6 in. on the bed and 4½ in. brick, is worth from 7s. 6d. to 8s. 6d. a yard; and a similar wall built of tooled ashlar (from Ringby or Hunter Hill), 6 in. on the bed and 4½ in. brick, cannot be built for less than 15s. or 16s. a yard. It will be seen, therefore, that these flat-bedded wallstones, although more expensive than brickwork, are considerably more economical than ashlar; the saving is effected not only in first cost of material but also in labour in dressing. The prices of wallstones vary according to the season, the summer prices being sometimes nearly 10 per cent. more than winter; but the following may be taken as average prices for material put on truck at the nearest railway station: straight-face wallstones, 43s. a rood, or about 3s. 1d. a yard; and pitched-face wallstones, 49s. a rood, or 3s. 6d. a yard; ashlar is worth about 1s. 6d. a cubic foot. The weight of a rood of wallstones is not more than 3½ tons, and, as the rate of carriage from the Halifax district to different parts of London varies from 10s. 10d. to 12s. 10d. a ton, the cost of wallstones delivered in the metropolis would be, say, 6s. a yard for straight-face and 6s. 5d. for pitched-face. We do not think that these prices are so high as to prohibit the use of Yorkshire wallstones in London, but we are of opinion that they might often be employed with advantage, as most of the stone weathers very well and has a pleasing appearance.

This question of durability is, perhaps, the most important of all, and the answer to it is "yes" and "no." In a house dated 1724, now standing opposite the east end of the Parish Church at Halifax, the tool-marks are still visible; in another house, which stands facing the east, within a few yards of the south gateway of the same church, and which is dated sixteen-hundred and something undecipherable, many of the wallstones are eaten into deep furrows along the joints and the most marked lines of lamination, and the surface will crumble away at a touch of the hand. To take another instance—certain houses at Northowram, dated 1681, still retain tool-marks on many of the stones; whereas a school in the same village, erected only sixteen years ago, exhibits wallstones in an incipient state of decay, some showing shallow furrows and others presenting a chalky appearance, which augurs ill for their durability. It is impossible, of course, to ascertain from what particular quarry or bed of stone the material of the older buildings just mentioned was obtained, and we are informed that the stone used in the erection of the school was supplied from *several* quarries at Northowram, some of which have since been worked out; other quarries, as the Park, &c., have since been opened.

It is imperative that these flat-bedded wallstones be laid on their natural bed. In a tooled or rubbed cube of the stone, it would in some cases be impossible to find the natural bed without trying to split the stone, but in most instances the lines of lamination are plainly visible, and in others they are revealed by wetting the stone. The shape of the wallstone, however, leaves no doubt as to the way in which it must be laid. Gwilt says, quoting *the* Commissioners, "Sandstones, from the mode of their formations, are very frequently laminated, more especially when micaceous, the planes of mica being generally deposited in planes parallel to their beds. Hence, if such stone be placed in buildings with the planes of lamination in a vertical position, it will decompose in flakes according to the thickness of the laminæ; whereas, if it be placed so that the planes of lamination be horizontal,—that is, most commonly upon its natural bed,—the amount of decomposition will be comparatively immaterial." We have, however, seen very thin flakes, more than half an inch square, peeling off the *vertical* faces of stones laid on their natural beds, the flakes themselves being striated horizontally. Some of the striations we have seen are dark brown. This surface-flaking results, we think, from the "stunning" of the stone during squaring, and the subsequent action of the atmosphere and of rain; it serves to prove that not all striations are sources of weakness. In fact, there are many dark streaks in blocks of riving stone, along which the quarryman strives in vain to cleave the stone. But streaks of *mica* must be shunned; these are the edges of planes along which rain will penetrate further and further year by year, wearing them out into furrows, and sometimes freezing and lifting the stone. Generally it may be said that self-bedded stone, as it contains a considerable quantity of mica, ought to be rejected, and only riving stone employed. Care should also be taken that the joints in flat-bedded walling are well flushed up and pointed, for if not, the edges forming the joints will be the first to decay. Straight-face wallstones are to be preferred before pitched-face, as the latter harbour dirt, soot, and moisture.

It should also be stipulated that no wallstones be cut from the "rag" or "shoddy" beds of the quarries, but that they be obtained solely from the best flag-beds. If these points are observed, Yorkshire wallstones will withstand the smoky and acidulated atmospheres of our towns for centuries.

To compare the weight and strength of the stone of which we are speaking, we have prepared the following table :—

Material.	Average weight per cubic foot in lbs.	Crushing weight per square foot in tons, and	Remarks on same.
Aberdeen and Peterhead Granite.	166	534	Mean of four experiment. on 1-in. and 1½-ins cubes.
Craigleith Sandstone	146	505	Stronger of two 2-in cubes tested by the Commissioners, &c.
Portland Stone.....	137	276	Mean of two experiments on 6-in. cubes by Committee of R.I.B.A. in 1864.
Bath Stone (Box) ..	123	216	Experiments on 6-in. cubes.
Patent Victoria Stone ..		415	Company's own Circular.
"YORKSHIRE STONE."			
Park Quarry, North-eastern.	155·5	715	Mean of three 6-in. cubes recently tested by David Kirkcaldy & Son.
Yew Tree Quarry, Lightelife (bottom bed).	150·6	699	Ditto.

These six experiments show that Yorkshire stone will not, on the average, yield under a pressure less than 11,000 lbs. per square inch. The "Park" stone, we may add, cracked slightly at 629 tons, and the "Yew Tree" at 532.

We append a succinct account in tabular form of the quarries of "Yorkshire Stone" in the Halifax district.

Flags, &c., from many of the quarries named in the table accompanying this article are sold to stone-merchants, and the quarry-owners do not know where they have been used, but in nearly all cases they are aware that some, at any rate, have gone to London. Great quantities are used throughout the provinces, and also in Germany and America. The principal owners, however, can point to many executed works, and some of them have agents of their own in London. Before specifying flags or other material for large works, architects and surveyors will do well to obtain from the best firms minute particulars of the places where their stone has been used, and then to inspect these places for the purpose of ascertaining the stone's durability and appearance. In no other way can a really satisfactory result be always obtained. If a firm can only state generally that its flags have been used, say, in London, and cannot point out the particular street, or rather portion of street, in which they have been laid, the information is of no value, and the architect must apply elsewhere; for it may be safely assumed that the quarry-owner who does not take the trouble to ascertain where his largest consignments of stone have been used has no pride in his work, and takes very little thought of the quality of his stone and of its future behaviour. It has not been considered advisable to state in this article where material from each group of quarries has been used, on account of the extreme difficulty of ascertaining and then of describing the exact *locale*, and also because in nearly all large buildings and streets stone from several quarries has been used by contractors. To take one instance, — it is stated in Rivington's "Notes on Building Construction" (Part III.), that flags from Elland Edge were used in the Victoria Station, Manchester; but this information is really either too much or too little, for flags were supplied for this building from at least two other groups of quarries in the Halifax District, and also from certain Lancashire quarries. It may be added that "special tooled" flags have been largely used in Lambeth and by the London County Council. These are of selected stone, tooled down to a perfectly level face, and are worth nearly a shilling a yard more than ordinary tooled flags on account of the extra labour in facing.

NOTES.

THE verdict on the deaths from the Carlisle railway accident amounts to a censure on the London and North-Western Railway for the use of a brake whose action could not be depended on. It is not often that any censure as to their manner of working their line could be sustained against this company, but we fear it will be the general consensus of opinion in this case that they have been trusting the safety of their passengers to a brake which is at all events not the best known, and against which a good many failures are recorded. One or two points the jury seem to have missed in their verdict. It was certainly an omission on the part of the conductor, Downie, not to have informed the driver who joined the train at Crewe that there had been trouble with the brake in the early part of the journey. Had he been informed of this, he would at all events have been put on his guard. On the published evidence we considered from the first that no blame attached to the driver, who acted according to rules and on the supposition that the brake in his hands would do what it professed to do. But one admission by Mr. Whale, the assistant locomotive superintendent of the company, is very remarkable, and seems also to have been overlooked. He admitted that the driver tested the vacuum brake a mile further from Carlisle than he need have done, according to rules, but went on to say that he would have done better to have left the vacuum brake alone and trusted to the hand and steam brakes. This would of course mean shutting off steam a great deal sooner and taking more time to pull up. That is a precise confirmation, out of the lips of an official of the company, of the criticism we first made on the accident—that it was one of the results of running it fine in pulling up a train, trusting to the power of the modern brakes to pull up within a short distance; a system which almost ensures an accident at a large junction station if the brake does fail. We have noticed this increasing tendency to trust to the brakes for pulling up short over and over again on the leading English lines of late years; we have been in a railway accident caused by that practice; and we now have another instance of it, and we have the admission of an important practical official on a great line to the effect that it is a recognised source of danger. Then the practice ought to be abandoned. Drivers should be instructed to allow more space for pulling up, at large stations, and proportionate time should be allowed them for doing so; and the power of pulling up quickly by the continuous brake should be regarded as a power for avoiding unexpected danger, not for habitual use so as to create an unnecessary chance of danger. Journeys by fast trains would be a trifle less fast in this case, but they would be both safer and more agreeable. The habit of pulling up quickly when at high speeds is calculated to add very much to the detrimental effect which frequent railway travelling already exercises on most constitutions.

IN regard to the question of a diploma for architects in France, the *Semaine des Constructeurs* quotes with approval a letter by M. de Baudot on this subject, of which the following is the first paragraph :—

"J'ai la conviction que l'institution d'un diplôme est dangereuse pour l'art, d'une application difficile dans la pratique, et qu'elle ne peut donner sérieusement satisfaction à aucun des intérêts mis en jeu; en tout cas, si cette opinion et erronée en principe, je ne pense pas que, dans l'état actuel des choses, qui est le résultat d'une système d'enseignement vague et d'un manque absolument de véritable éducation professionnelle, il soit opportun d'armer aujourd'hui l'architecte d'un droit exclusif à l'exercice d'une profession dont les limites ne sont pas nettes."

This, it will be seen, is a repetition almost in so many words of the argument in support of Professor Roger Smith's resolution at the Institute the other evening. M. A. Lejeune, in *L'Architecture* of April 12, has the following remarks on the same subject, which forms nearly a repetition of the argument we used in our last in regard to the real cause of the want of power of the architectural profession, in comparison with that of the engineers, to act effectually in protecting their own highest interests :—

"Donc alors, un diplôme, un titre quelconque, ne serait autre qu'une satisfaction personnelle, et cela d'autant plus qu'aucun client n'oserait jamais demander la production d'une pareille valeur, d'un pareil titre.

Somme toute, aujourd'hui que le diplôme n'existe pas, est-ce que les choses marchent mal, et mal à ce point de voir chacun se plaindre? Est-ce qu'on manque d'hommes intelligents, capables? On manquerait plutôt d'hommes vraiment sérieux, foncièrement honorables (les capacités ne donnent pas toujours ces dernières qualités). Aussi aujourd'hui, et pour le moment, du moins, au lieu de diplôme, d'exigences, soyons tous égaux (en apparence du moins). Tendons-nous franchement la main! aidons-nous; unissons-nous! *L'union fait la force!* C'est en nous voyant plus souvent, et d'un œil vraiment confraternel, que nous apprendrons à nous mieux connaître, à nous apprécier plus sûrement, à nous respecter enfin. Là est le meilleur moyen de diminuer les faux frères qui peuvent exister encore et de ramener les récalcitrants."

WE report in another column the decision come to at the Institute special meeting on Monday last, to elect Mr. Waterhouse as a president for a third year. There could be no better opportunity for departing from the usual rule of two years than in the case of Mr. Waterhouse, who has attained a position in the profession which is in some respects unique, and who as President has exhibited a rare combination of courtesy and tact with business capacity.

THE Railway Rates Inquiry has now entered upon what we regard as one of the most practical stages. Indeed, it seems a pity that the time of the Court should have been occupied for sixty days before reaching this important stage, and that a large proportion of the evidence already offered might have been profitably reserved until now. The position of the articles in the proposed classification is at last being considered, commencing with the lowest,—the railway companies defending their proposals and the traders explaining their objections. Thus, bricks are placed in Class B, and makers urge they should be in Class A. The companies take the broad ground that the latter class should consist exclusively of unmanufactured raw material; while the traders urge that bricks are carried in heavy, compact loads, and are dealt with in the matter of loading, &c., in precisely the same manner as raw material. The brick and tile makers' interests were well looked after by Mr. Impey, of the South Staffordshire Brickmakers' Association, and others, and the position of various descriptions of iron, &c., were subsequently argued in a similar manner. The rate of progression is very slow, and when the higher classes are reached it will probably be still more tedious, as they include many more articles than the lower. Of course, the Court reserve their decision upon the disputed points, but they give expression to their opinion occasionally in a manner which shows that the position is clearly grasped, and that the arguments of both sides are well weighed.

THE case of Barlow *v.* Ross, reported in the current number of the *Law Reports* (24 Queen's Bench Division, p. 381), is of interest and importance. Fortunately, also, it is as simple as it is important. The Artisans and Labourers' Dwellings' Improvement Act, 1875, section 20, provides that upon the purchase of any lands for the purpose of the Act, "all rights of way . . . . and all other rights or easements in or relating to such land or any part thereof shall be extinguished," subject to persons who are proved to have sustained loss under this section obtaining compensation. In 1877 the Corporation of Birmingham purchased some land for artisans' dwellings; opposite to it was the plaintiff's house, which for ten years had en-

joyed an easement of light over this land. In 1886 the defendant obtained under lease from the Corporation a part of this land for the purposes of the Act, and in 1888 obstructed the plaintiff's light. The question then arose whether the operation of the Act obstructed inchoate and accruing rights to light. For when the Corporation purchased the land, only ten years of the prescriptive period had run. The Court of Appeal decided that the Act by its terms did extinguish such right, and therefore that after the Corporation had bought the land in 1877, the growth of the plaintiff's rights ceased. But they were also of opinion that such growing rights were the subject of compensation, and that the plaintiff had had "a legitimate ground of applying to the Corporation for compensation." That this decision is in the main correct cannot be doubted; were such inchoate rights to light to be allowed to go on growing the whole use of the purchase of a piece of ground might be put an end to. Of course when the land was purchased there could not be said to be a right or easement of light in existence, and we have some doubt whether legally or morally a man with an inchoate right to light should have compensation. It is clear that if an ordinary purchaser bought the land and erected an obstruction to the light, the man with a growing right would have no right of action. Consequently it is difficult to see why a public body should be in a worse position than a private individual. On the other hand, if the private individual did not obstruct the light before the prescriptive period of twenty years had elapsed, he never could do so. Hence the compensation for an inchoate right is a kind of golden mean to enable a Corporation to be safe in the future.

WE hear from Athens that some gold ornaments have been discovered by the British School at Megalopolis. Owing to recent heavy rains, operations had to be stopped at the theatre, and attention was directed to the tumulus mentioned by Pausanias as the tomb of Aristomenes. A trench was started outside of this, and almost at once a quite plain marble sarcophagus was come across, containing bones and fragments of gold ornament. These are described as being of beaten gold, somewhat similar to the Mycenæ ones, but no definite conclusion can be come to as to their date till they have been more carefully examined. Work was stopped next day for the Easter holidays, and immediately these are over further investigations will be proceeded with at this spot.

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ON Wednesday, 30th inst., will be put up for sale, at the Mart, the ground leases, for fifteen years unexpired, of Nos. 166—173, Piccadilly, comprising the Dudley Gallery and the Egyptian Hall (No. 170). The three leases, with ground-rents, amounting to 388*l.* 3s. 6d. per annum, are held directly from the Crown; the property is at present under-leased at a total rent of 3,144*l.* a year. The Egyptian Hall was built in 1812, at a cost of 16,000*l.*, after the designs of G. F. Robinson, architect—(the figures of Osiris and Isis are by L. Gahagan),—for W. Bullock's museum of natural history specimens gathered in Africa, the Pacific, and the Americas, together with many objects from the Leverian collection,

all of which were sold seven years later. The hall was then used from time to time for the exhibition of numerous pictures, models, "marvels," and other shows. These included Seurat, the "Living Skeleton," of whom a full account is given in Hone's "Every Day Book," vol. i., columns 1017-34; Haydon's painting of the mock-election at the King's Bench Prison (1828), which George IV. purchased for 500 guineas; and, in 1844, his "Ostracism of Aristides," which, as that unfortunate man has himself told us, proved so sorry an attraction as compared with the dwarf "Tom Thumb" in the same building at the same time; and the "Siamese Twins," in 1829. Also a model of the tomb of Psammuthis, discovered by Belzoni (1821); Captain Siborne's model, with figures, of Waterloo, shown twice, in 1838 and 1845, and since deposited at the United Service Museum, Whitehall; Sir George Hayter's picture of the first reformed House of Commons (1843); Brunetti's two models of Jerusalem (1847); Banvard's diorama of the rivers Missouri and Mississippi (1848); and Bonomi's panorama of the Nile (1850). In 1852 Albert Smith first gave here his illustrated lecture upon his ascent of Mont Blanc.

THE latest of the series of paintings which Mr. Ford Madox Brown is executing as decorations for the Town Hall of Manchester (the tenth in number) is at present on view at Messrs. Dowdeswell's in New Bond-street. It represents John Kay, the inventor of the Fly-Shuttle, saved by his wife from the rioters, who proposed to take vengeance on him for the same reason that the Luddites in later times attempted to wreck machinery and lynch the owners of it, viz: for the crime of inventing labour-saving appliances. Kay's wife had him carried out, according to the story, by two of his workmen, concealed in a woollen sack or wrapper, and conveyed away in a cart from the scene. The painting shows the moment when Kay is being enwrapped and two of his men are about to carry him off. The whole scene has been cleverly got into a form for decorative painting, the long side of the room occupying the length of the panel, with the rioters seen through a window on the left and the cart through an open door on the right, the main group of figures being towards the right. This group is rather a confused tangle, and at first sight the head and shoulders of Kay appear to belong to the legs and feet of the man who is stooping to lift him; an unfortunate effect which the eye does not quite lose sight of even after the various personalities have been disentangled. The figures of the wife and children, all of whom seem very young in comparison with Kay's bald head and grey hair, are curiously short and stumpy in their proportions. The boy half lying on the table to get a look through the window is very cleverly drawn. On the whole we fear the general effect of the scene, in spite of the fine character and individuality of the heads, is a little ludicrous, though it tells its story with energy enough no doubt. It is a painting decorative in method and execution, but realistic in conception; and the two things hardly go together.

AN excellent piece of arras tapestry has recently been executed by Messrs. Morris & Co., from the cartoons of Mr. E. Burne-Jones, and is intended to occupy the wall over the rector's stall in the chapel at Exeter College, Oxford. The subject, the visit of the Three Wise Men, has been treated in much the same manner as is usually done, but some of the details, such as the "Star of Bethlehem," being held in the hands of an angel in white and gold, and the Virgin being seated in an arbour surrounded by flowers, is a departure from the conventional treatment. The scheme of colour generally is low in tone, blues and reds forming the chief colours in the draperies, and the background a dark blue forest; but much light has been introduced in the central figure of the angel, and on the steel armour of one of the figures. The execution of this steel work, and of the watered-silk worn by another of the Wise Men, is especially noticeable. The foreground is composed of grass thickly carpeted with flowers,—chiefly white lilies and blue iris.

AMONG the principal works at the Dudley Gallery Art Society's Exhibition are various large drawings by Mr. Walter Severn, two from Mentone, "The East Cliff" (163) and "The Old Town" (234), both of them rather hard in effect, especially as to the treatment of the sea; in the last-named the irregular piles of red-roofed houses are effectively treated. His "Crinan Canal" is a fine work (221), though here again the water is the least satisfactory portion. Among the most artistic works exhibited are various drawings by Mr. Fullwood, especially "By the River, Old Windsor" (122), a fine landscape with very rich colour and with a style of its own. His "Harvest" (120) is really a study of an old churchyard with its company of moss-grown head-stones in the foreground; a powerful work. Miss O'Hara's "Night's Shadows Falling" (212) is a study of sea in twilight of more than ordinary merit. A large drawing by Mr. R. Jones "Early Spring" (224) shows some fine painting of trees. Mr. F. G. Coleridge's various scenes on the Thames are good, and resemble the places they are meant for, which is not always the case. Signor Giampietri sends one of his admirable studies of Roman architectural remains, "Clivus Capitolinus" (58). Along with a good deal that is commonplace there are various other works of interest which we have not space to mention more particularly.

THE Ruskin Museum at Sheffield has at last been brought into a more accessible situation, experience having proved that the working man, when he has a holiday, will not take the trouble to walk two or three miles up hills to study a collection of art-treasures, as anyone but Mr. Ruskin might have known from the first. The new Museum, in Meersbrook Park, was opened on Tuesday last by the Earl of Carlisle, whose speech was followed by one from Mr. Arthur Severn which afforded a characteristic example of the logic of the disciples of the Ruskinian *cultus*. Mr. Severn is grieved that it should be necessary to show in the British Museum and other museums so many things that are not beautiful; "he would have no South-Sea gods, no skeletons, and no ugliness of that kind." So that history and anthropology go for nothing, we presume. But there is another question besides this: is Mr. Severn quite certain that we should fully realise beauty if we had no conception of its reverse? Does he forget Goethe's answer to the man who objected to the presence of evil in the world—"So you want to jump off your own shadow?" The same thing applies in the artistic as in the moral world: we cannot jump off our own shadow.

Land at Knightsbridge.—A correspondent writes:—"The unique building site forming the 'island' at the junction of the Brompton and Knightsbridge roads, which has for so long been occupied by small buildings entirely out of character with the present requirements of the neighbourhood and surroundings, has, we understand, been recently disposed of by Messrs. Chadwick, of Parliament-street, Whitehall, Messrs. Pinder, Simpson, & Newman, acting for the lessee. The site, which occupies an area of about 36,000 ft., with the extensive frontage of between 700 ft. and 800 ft., is believed to be one of the most valuable and important pieces of land which have come under development in the West-end of London for several years past. It is to be hoped that the buildings about to be erected on it will be of a higher architectural character than those with which some other important London sites have of recent years been covered." We believe the architect is to be Mr. Spencer Chadwick, but do not know for what purpose the buildings are intended.

THE NEW MUSEUM AT BERLIN.*

IN 1883 a new building, destined to hold the geological, palæontological, mineralogical, petrographical, and zoological collections of the Berlin University was commenced, and in December last its inauguration took place, the German Emperor personally declaring it "open."

Although situated at some distance from the homes of those people most likely to visit it, the new Museum has wisely been placed in close proximity to the Royal Agricultural and Royal Mining Colleges (both of which contain valuable collections), and it now takes up the central position in this imposing group of buildings.

As to the exterior of this new home of Natural Science, not much can be said, excepting that the architect-in-chief, Professor Tiede, has done as much as he could to ensure a monumental appearance of the building, considering what very meagre means were granted for the benefit of the façades. The central feature of the front elevation, which stands in advance of the main flight, is emphasised by a columnar order, and this part has been adorned with the statues of Johannes Mueller and Leopold von Buch and the sculptured heads of Ehrenberg, Alexander von Humboldt, and Weiss. All the other parts of the exterior are of a very monotonous and rather badly-proportioned design.

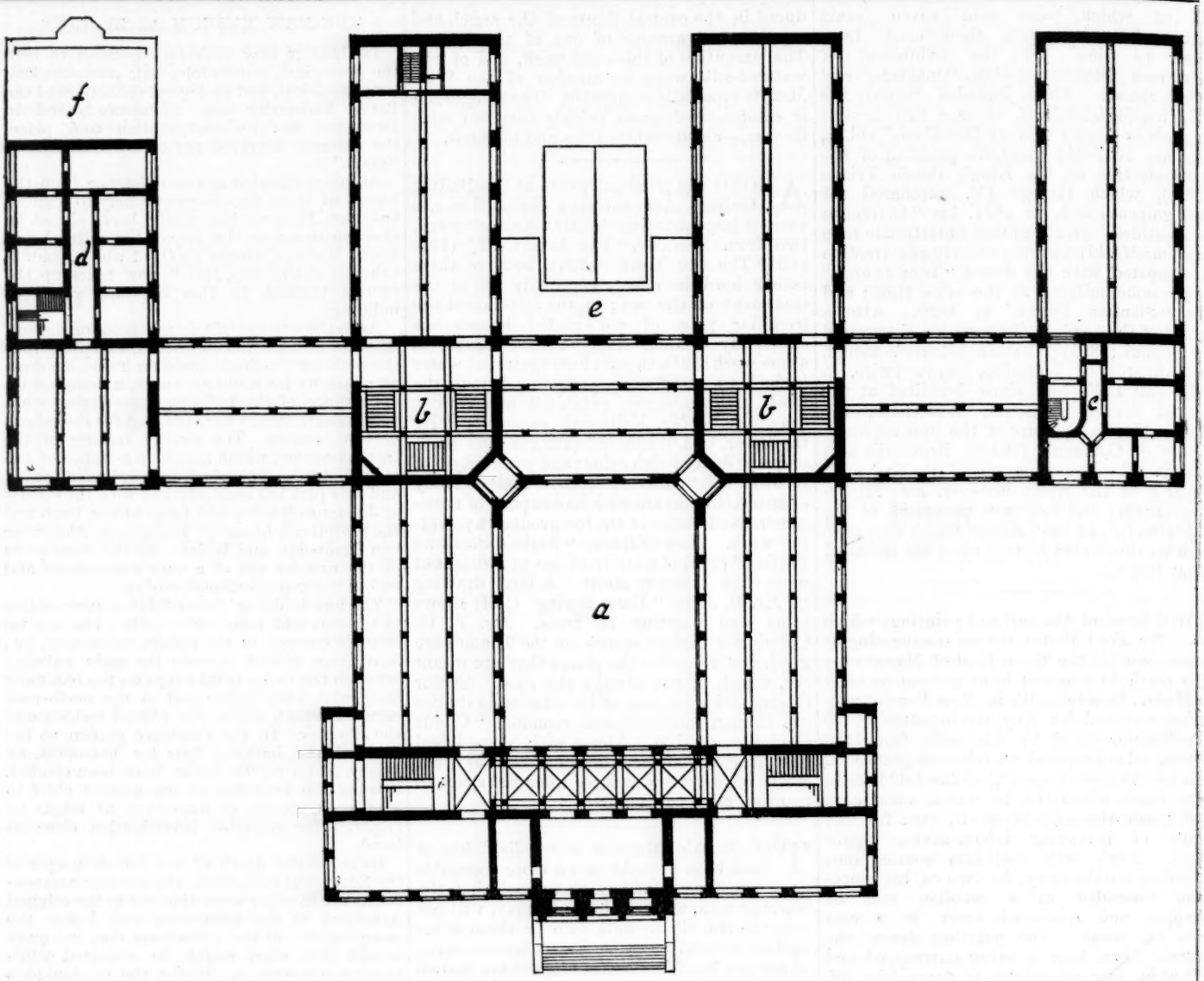
The new building covers 8,145 square mètres of the site, and faces due south. The central court is covered in, the boilers, machinery, &c., have been placed outside the main building between the two central wings on the basement level, with a top light; and in the north-west corner the plan shows the official residence of the director. In the extensive garden at the back of the building, huts for mammals, an aviary, and a reptile house have been erected, it being the intention of the present chief to keep such species of live-stock as might be required for scientific investigation close at hand.

Owing to the death of the former keeper of the Zoological collections, the interior arrangements are in many ways different to the original intentions of the promoters, and hence the grouping, &c., of the collections does not quite accord with what might be expected when looking at the plans. Whilst the original idea was to have all the collections (and hence also the different stories) accessible to the public, the Museum as it now stands is divided into two separate departments,—(1) scientific collections for the professional student; (2) popular collections for the general public; and as the latter are all situated on the ground and basement floors the enormous staircases leading to the upper stories become quite unnecessary. Another point not at first intended is the organisation of a so-called Zoological Institute, which takes up the greater part of the west wing; here some of the large show-rooms have had to be divided up and be changed into a set of lecture-rooms, work-rooms, and studies, together with all such offices as are required for the scientific investigation of zoological questions. Besides these two considerable alterations, which are solely due to the new director, Professor K. Moebius, various smaller but, perhaps, not less important new dispositions have been made.

For instance, Professor Moebius has taken special interest in the planning (*i.e.*, positions, measurements, colour, &c.) of his show-cases, and the internal arrangements of every room under his control have been worked out under his direct superintendence. Numerous trials have been made, and the Professor's great aim has been that the new museum should even excel in detail the model museum he had organised at Kiel some years ago. He has reached his ideal, his show-cases have been planned in a most practical way, all receiving excellent light, and their positions not only leave the visitor plenty of free passage, but naturally compel him to make a systematic tour through each room.

It has been Professor Moebius' great desire to prevent the eye being distracted more than needs be, and therefore he has placed the exhibits so that the visitor can never see too much at a time. All his show-cases, excepting now and then a corner one (which then contains exhibits of larger size than the rest), are divided lengthways by movable

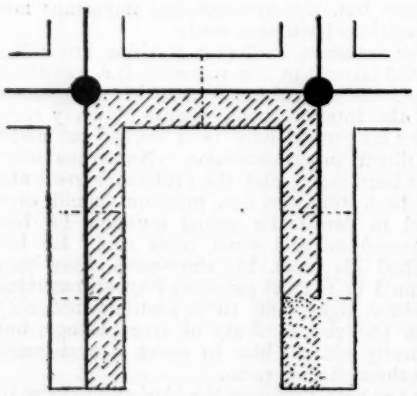
* Das Neue Museum für Naturkunde zu Berlin. We are indebted to the Director, Prof. Moebius, and the superintending architect, Bauinsp. Kleinwaechter, for the particulars.



Sketch Plan of Ground Floor of New Berlin Museum.

a. Covered Court. *b.* Main Staircases. *c.* Administration. *d.* Zoological Institute. *e.* Machinery, &c. *f.* Director's Residence.

canvas partitions, as shown in the diagram, thereby causing the show-room to consist of a set of separate compartments in which can be seen only those things that are contained therein. Of course, the visitor does not, according to this arrangement, find such an agreeable view, or perhaps one may say such a picturesque confusion, as he has been wont to find in most museums; he does not find a room full of transparent cases filled with many-coloured objects on which the light plays on from different directions; but it is argued that this is not the object in visiting a museum.



Arrangement of Screens to Cases.

All the halls and rooms of this new Museum have, by the Professor's directions, been kept as plain as possible, and the show-cases (which are of iron) have no unnecessary mouldings or ornamentation. The fittings, partitions (*i.e.*, backgrounds), &c., of these cases are all uniformly painted in a yellowish-grey tone, somewhat like the tint of a lithographic stone, and all such apparatus (both of wood and iron) as are used for mounting the objects exhibited are of the same colour. This prevailing tint forms an excellent background for showing up the various objects exhibited, and marking the outline of the object as distinctly as possible, and at the same time does not attract or distract the eye in the least.

Such objects as are entirely transparent, or nearly so, and which hence require a good light at the back of them if their fibres, &c., are to be seen at all, have been placed in small show-cases in front of the north windows, and can be examined with ease without incommoding the free passage.

All the details of the plan have been devised with a view to giving every facility for the examination of the contents of the building.

The Zoological Institute, under the direction of Professor Schultze, has, in spite of its quite recent organisation, according to the requirements of the new administration, been excellently arranged. It has been so planned that the visitor ascends from the garden in which the live animals are kept, or from the cellars, where an aquarium has been placed, to the rooms in the basement, where the coarser work of the preparer is done by his servants, and from this floor to the one above, which is destined for more careful work and scientific investigation, and then finally ascends to the second floor, which is taken up by lecture and demonstration-rooms. A large lecture-hall on this floor has 300 seats, and another on the first floor 80; and room has been found for the tables, instruments, &c., for the 50 students who will take the practical courses in "observation and examination" of zoological matter. At the top of this wing, hot and cold rooms and also an open terrace have been planned for the reception of living animals coming from other climates, and in close proximity to these novel habitations a set of photographic ateliers and observation rooms are to be found.

On the first and second floors of the east wing the committee-room and library, the studies of the Director, several keepers and assistants and the offices of the administration have been placed, and if there is any mistake in the planning it is certainly to be found in the steep and very badly lighted staircase which leads to this very important part of the building. In fact, the whole of this little bit has been wrongly placed; its natural position would have been in the west wing in close proximity to the Zoological Institute and the official residence of the Director. As to the latter, it shows no point of interest; it is, if anything, too roomy, lacks comfort, and according to its position in the building receives the north and east winds,—a great disadvantage in a German climate.

As a whole, however, the building may be well called a success; it is well adapted to its purpose, has plenty of air and light, and has the advantage of not being over-decorated. As mentioned above, the working out of the designs was placed in Professor Tiede's hands, who, together with Bau-Inspector Kleinwaechter, has superintended the erection, the latter gentleman being especially appointed for the technical and business superintendence. As to construction, the whole of the building, except the roof, is of fireproof materials. Steam and hot-water coils have been used for heating purposes. The Museum building, not counting fittings, has cost 3,200,000 marks, the fittings alone 970,000 marks, making a total of 4,170,000 marks, or nearly 208,500*l.*

French Exhibition in London.—It is announced that the French Exhibition at Earl's Court and West Brompton will be opened at 3 p.m. on Saturday, May 10, by the Lord Mayor of London. The French Committee, we are informed, are of opinion that this will be the most representative display of arts and industries yet made by France abroad.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

RE-ELECTION OF THE PRESIDENT.

A special general meeting of the members of this Institute was held on Monday evening last, Mr. Arthur Cates, Vice-President, in the chair.

On the motion of the Chairman, seconded by Mr. J. Macvicar Anderson, and supported by Mr. Henry Dawson, it was unanimously resolved to suspend By-law 26, which limits the term of office of the President to two years, in order that Mr. Waterhouse might be elected to that office for a third year.

Mr. Waterhouse shortly afterwards entered the room, and on taking the chair expressed his thanks for this mark of the members' goodwill and confidence.

The tenth ordinary general meeting of the session was then held, Mr. Alfred Waterhouse, R.A. (President), in the chair.

Church Fittings.

Mr. J. P. Seddon read a paper on "Church Fittings." The following is an abstract of it:—It is a question depending on the special circumstances of each particular case how far the fittings of a church should correspond in character with the architecture of the fabric. It is doubtful, as this age possesses no special style of architecture of its own to bespeak its historical succession, whether artistic harmony or archæological consistency be the more important. A good rule where an old church is concerned is to leave it alone; but when one has to be refitted, it would seem that its furniture should not be of an earlier, but might be of a later style than that which is the prominent one of the structure; while with regard to wholly new buildings, they and their contents should certainly correspond. In all cases, however, the introduction of novel materials or modes of workmanship, and of the highest class of the subsidiary arts employed, may well serve to distinguish church fittings as being of the nineteenth century, and not merely slavish copies of old examples. As to church planning, the native Gothic style, than which (as laid down in the paper of "Requirements and Suggestions," issued by the Incorporated Church Building Society) none is more generally suitable for a church in the United Kingdom, is elastic enough to admit of any change needed to accommodate modern use and ritual; whereas that now fashionable for secular architecture, which ignores the scientific invention and beauty of the pointed arch, does not seem, even in its *chef-d'œuvre* of St. Paul's Cathedral, to have been able to assimilate a frank expression of constructional and ecclesiastical needs with its empirical rules of design. Simplicity of plan and amplitude of scale are more preferable for modern use than elaborate but diminutive detail, and in this respect it would be well that our architectural works should emulate the engineering ones of the day. The author has endeavoured in this new Church of St. James at Great Yarmouth to embody his own ideas of the manner in which he would deal with modern problems, in the architectural language inherited from our Mediæval ancestors.

Church fittings, without reckless abandonment of precedent, should as a first requisite subserve utility, but may at the same time be made objects of beauty, and admit of ornamentation of high class and varied nature; among them

Fonts have in past time been specially distinguished by the lavish thought and art bestowed upon them and their accessories, and nowhere more so than in this country. Those of the Norman period, though the earliest, are generally the richest and most vigorous; those of the thirteenth and fourteenth centuries are more refined in their ornamental detail, but display less fancy in design; the Perpendicular fonts of the fifteenth century are no longer grotesque, but graceful in proportion and more appropriately enriched. The exquisite canopied spire of the font cover of Ufford Church, Suffolk, and the noble baldachino-like enclosures of the fonts of St. Peter Mancroft Church, Norwich,* and of Trunch Church, Norfolk, are examples of the magnificence often indulged in as regards this particular feature of church fittings by our ancestors. Modern munificence is often displayed upon the same objects, and we have at disposal for the purpose still richer marbles, with cloissonée and other kinds of mosaic, and the zealous services of able sculptors if we would only employ them. In the fonts of Llandaff Cathedral, Rotherham Church, St. Margaret's Church, Westminster, and others, executed from the designs of the author, some of these means have heen made use of as far as funds have permitted.

Pulpits, as Mr. Ruskin has said, may be over-ornamented, and if the preacher is to be thereby made to appear insignificant in comparison, as in some of the extravagant examples in Continental cathedrals, this has obviously been the case, yet the moderate richness of design seen in the specimens collected and published by Mr. Dollman from old churches in England cannot fairly be so censured. In the pulpit in course of erection for the choir of Norwich Cathedral, in honour of Dean Goulburn, from the designs of the author, the material employed is oak; that for Llandaff Cathedral is in stone, with marble columns; while others are entirely of marble, as at St. James's Church, Paddington, and Betchworth Church, Surrey (executed by Messrs. Blacklee, of St. Marychurch, Torquay, in their marbles from that locality); in the latter, mosaic has also been extensively employed. Drawings of other designs of a simpler character both in stone and wood suitable for small and cheaper churches are also exhibited.

Lecterns may be considered in connexion with pulpits as being the appliances in most churches where the Lessons are read; yet for this particular purpose their usage dates only from the seventeenth century. Many old examples of lecterns are, however, to be found, and those which take the form of eagle-desks were no doubt intended for the reading of the Gospels from the north side of the sanctuary, and other simpler ones were provided for the Epistles to be read from, and for other purposes for which uses were formerly and might again be found. As, however, one lectern only is now usually employed in moderate-sized churches, there seems no reason to object to this being of the eagle-desk variety. This is generally made in brass, and may be a costly object. That at Llanbadern Church, near Aberystwith, has an eagle made in majolica ware, with stone support; and that at Ingham Church, Norfolk, has a similar eagle on a wooden base, and designs for several of a simple and inexpensive character are also shown.

The Altar, with its surroundings, is, of course, the principal object in a church, on which the highest efforts of the architect to dignify it should be employed. The altar-table should be of sufficient width and height—not less than 8 ft. long as a rule, nor more than one-third the width of the chancel; 3 ft. 5 in. is the minimum height, 2 ft. 3 in. is sufficient for the width, as such will permit of the retable being then conveniently reached. The table itself does not require elaborate ornamentation, as its purpose is to be vested with rich altar-cloths; at the same time it should not be mean. Wood is the material most in use, but the altar-shelf behind it, to support the cross, candlesticks, and flower-vases, should be a part of the structure of the east end, and may be of stone or marble built into it. The drawings shown comprise the table in Lambeth Palace Chapel, St. James's Church, Great Yarmouth, and Christ College Chapel, Brecknock. The example given of an altar-shelf is from the new church at Gorse Hill, near Swindon Station; and that for the altar-rail for Norwich Cathedral, recently executed from the author's designs by Messrs. Starkie, Gardner, & Co., in brass and enamel on groups of marble columns; together with others in wood for smaller churches, are also shown.

The Reredos is the background to the altar-table, and therefore it is enriched in order to concentrate attention to that. Consequently it should not appear as if its object were to draw all eyes to itself. Even though the whole east end of the chancel be combined into one magnificent scheme of decoration, prominence should be given to what is the reredos proper—the immediate background of the altar-table, extending but little on either side of it, and rising to no great height above it, and not encumbered with sensational sculpture. This is the position generally chosen for a carved panel representing the Last Supper, a subject essentially picturesque in contradistinction to sculpturesque, and in white marble ineffective at a distance. Such a panel was placed in the reredos designed by the author for St. James's Church, Paddington, to his great regret. In St. Saviour's Church at Bath the reredos is of stone, executed by Mr. Hems, with a white marble cross in the central panel surrounded by foliage, with seven doves; and in the side ones are the four Evangelists' emblems, and all are in high relief carved in alabaster. At St. Peter Mancroft Church in Norwich the reredos is in oak, and in the Perpendicular style, of which that noble church is a fine example; other examples of a simpler character shown are from Llanbadern Church, Aberystwith, and elsewhere.

The Seats for the congregation are the principal fittings for a church, and it is essential that they should be comfortable, and yet not conducive to lounging, and that they should afford proper facilities for kneeling. The variation of practice in so simple a matter is astonishing, and therefore the subject is now under the consideration of the Committee of Architecture of the Incorporated Church Building Society, as the paper entitled "Requirements and Suggestions," already referred to, is now under revision, and it is proposed to submit it to the criticism of this Institute before it is finally settled upon. Mr. William Butterfield has given his views, founded on great experience, in a pamphlet entitled "Church Seats and Kneeling-Boards," which deserves careful consideration. Several examples are shown in which the author has from time to time striven to arrive at the best result with due regard to economy, and he also submits an attempt to provide suitable kneeling accommodation in cases where churches are furnished with chairs instead of fixed seats, which has been worked out by Mr. Carter, joint architect with himself for Grange Town Church, near Cardiff,

The Choir-stalls and Desks which were given to Rochester Cathedral nave as a memorial to the memory of his father by Canon Cazenove, and the stallwork in the chancel of St. Nicholas's Church, Great Yarmouth, are shown as examples designed to suit special conditions in the former case, and as suitable for a large church in the latter, and others for smaller churches in addition.

Church Screens are objects of extreme importance with regard to the effect of church interiors, against which, unfortunately, there is a modern prejudice, and in one diocese, at any rate, they were all but prohibited. They have, however, a useful purpose as marking the separation of the sanctuary from the congregation, and, æsthetically, a church seems unfurnished without one. At Ingham Church, in Norfolk, the lower part of a magnificent old stone screen exists, and a design for a conjectural restoration of the upper portion to accord with what remains is exhibited. Wood, however, is the more ordinary material employed, and admits of great variety of treatment, whether simple or rich, and some examples are shown.

These and other church fittings, with monuments to the memory of the departed, are, perhaps, the best opportunities afforded to architects at the present day upon which they can devote their efforts to realise their own ideas of beauty; but it is earnestly to be desired that they would, whenever able, call to their assistance sculptors and painters as well; and thus, by re-establishing the unity of the arts, which is an essential to their success, strive to enlist the sympathy and interest of the public, and render our churches once more museums for the people of this highest order of sacred and ecclesiastical art.

Mr. Wm. White, F.S.A., opened the discussion. Upon the general principles which the paper had brought forward he believed they would be all pretty well agreed. There could be no doubt that the Mediæval Gothic of England was sufficiently elastic for all present purposes, in spite of some objections to it as representing disused and abolished practices and ritual. The present Prayer-book, including the at present much-discussed Ornament Rubric, really represented the views which the Reformers had in eradicating from the Church what were regarded as superstitions. Mr. White continued that he was glad to hear that was considered an offensive term. It was not the term he would use, but what was much used at present to bring into discredit the treatment of churches generally, which he maintained ought to be followed. For such subordinate fittings as seats they ought to beware of great elaboration; nevertheless in churches which were elaborately finished it would not be right to leave the seats uncared for in their general treatment. At the same time strict convenience in treatment ought to be followed, and the question of the sloping seat was a matter which had created a great deal of difficulty

* Illustrated, as restored by Mr. F. T. Baggallay, in the *Builder* for January 4 last.

Lecterns, again, ought to be designed with a sufficient slope to enable the reader to see readily without turning his face downwards towards the book. The height of many old altars was 3 ft. 3 in., and that, he believed, was better than a higher one. The centre should be treated as one with the altar itself, and not as a separate panel. He did not like the plain Latin cross in the centre. It was a distinctly modern invention, and not introduced in Mediæval or earlier times in this way, being then considered as worthy of the highest decoration. The treatment of sculpture and painting for the centre of the reredos ought not to be sensational or realistic in any way, but rather suggestive, or what was termed conventional. In this connection he was sorry to have to express an opinion on one of the most magnificent frescoes of the present day, viz., that on the reredos at Lyndhurst Church, which, to his mind, set at defiance those principles. In that case, there was a realistic figure standing apparently in the middle of the altar in a way which was not agreeable. A church for a very large congregation was not the best for sound, unless divided up into aisles as well as nave, when it would in reality cost less than if it were not so constructed. The position recommended in the paper for the pulpit was the north side, but he considered the other side the right position; and in old churches where pulpits occupied their original place, they were found to be on the south side. Mr. White concluded by proposing a vote of thanks to Mr. Seddon.

Mr. S. J. Nicholl seconded the motion, and complimented Mr. Seddon on the fine collection of drawings he had exhibited. The old tradition of the font was that it should be approached down some steps, the original idea being that as they were born again in baptism, so they should descend into the tomb. The "wine-glass" pulpits were apparently reached by a portion of the staircase to the rood-screen. There were two ideas connected with the altar: the one that it was a table, and the other as to its being the tomb of the Martyr. The old idea of the communion-rail was that of a kneeling-bench. One could not help observing the great convenience of the loose seats common on the Continent. Something had been said as to the pulpit not being made magnificent, and Mr. Seddon had remarked that they were frequently too large. But any one who had seen an archbishop preaching from one of those Continental pulpits, especially with his mitre and crosier, would not consider the pulpits were too large.

Mr. R. Herbert Carpenter supported the vote of thanks, and spoke of the magnificent bronze fonts he had seen in the churches of Bremen. At St. Margaret's, Westminster, the font was so situated that it would suffer when the church was crowded. In the foreign churches he had referred to, however, the fonts were surrounded by splendid screens. He also mentioned the splendid font with stone spire and screen, at Lubeck, standing in the centre of the nave. This was parallel to those he had referred to, only on a much grander scale. He was glad Mr. Seddon had objected to the introduction into the reredos of sculptured representations of the Last Supper, it being a subject which never told in sculpture unless it was falsified, the great expanse of white tablecloth, in fact, spoiling any picture.

Mr. E. J. Tarver said that on the first occasion when he had to design church seats he cut out a facsimile of the human figure in cardboard, and having arranged it in what looked like a comfortable posture, he fitted the seats to it.

Mr. William Woodward remarked that he had been very much struck with the beauty of a font in the Baptistery at Pisa. The finest benches for seats that he knew were in the parish church of Hampstead, designed by Mr. Cockerell. These were Classic in feeling, and, to his mind, were very beautiful. With regard to chairs, those who had visited Continental cathedrals would be sorry to see the chair principle adopted in this country. The noise created through the dragging of the chairs during the service was very detrimental to the attention which ought to be paid in church; and for the same reason he objected to a tile paving. As to the organ, it was not necessary that an architect should be a musician; but in designing a church he should make provision for the organ, giving it sufficient space, and not providing a small chamber in which the organ was buried, and its music lost. With regard to the church at Lyndhurst, he considered the fresco there by Sir Frederic Leighton the most beautiful and harmonious treatment possible of the eastern end of a church.

The President said it was refreshing to have this old subject brought before their notice again. No one in the discussion had alluded to Mr. Seddon's remarks as to grandeur of scale and simplicity being a desirable object in building churches. This had been very much brought to his mind lately during his sojourn in Spain, where the churches were so very noble in their proportions. One felt on coming back to English churches that there was something very mean and despicable in a seat. It should be borne in mind, too, that if the seats were made too comfortable it rather tended to long services, which, perhaps, were not desirable.

The vote of thanks was then put, and carried by acclamation.

Mr. Seddon, in his reply, agreed with what Mr. White had said as to the use of the Latin cross. In regard to another question, in one of his drawings he had shown a board specially put for hats, and at the end was a place for umbrellas.

The proceedings then terminated.

Illustrations.

THE DRAWING-ROOM, GREYFRIARS, DUNWICH.

THIS room forms part of an extensive addition to Greyfriars, Dunwich, the seat of Colonel St. John and Lady Constance Barne.

The mansion stands in a well-wooded park close to the sea, and the site is altogether a beautiful spot. A seaside treatment has been adopted for the additions, with a wide verandah on the ground-floor and balcony above, whilst the style of the exterior is a free treatment of Tudor to harmonise with the old part of the house. Adjoining the drawing-room, and opening into it, is the boudoir, fitted up in similar style to the drawing-room.

The woodwork of the drawing-room is in light-coloured wainscot with inlaid parquetry floor and plaster ceiling. The dimensions of the room are 60 ft., by 25 ft., by 13 ft. high.

Music is the chief subject illustrated by the carvings, full-size details of every portion of which have been supplied to the carvers, Messrs. John Groom & Son, of Ipswich.

Mr. Alfred Brown, of Braintree, is the contractor, and Mr. E. F. Bisshopp, the diocesan surveyor, is the architect.

ASHLEY HOUSE, SHAFTESBURY AVENUE.

THIS building occupies a prominent corner site at the junction of Dyott-street and Shaftesbury Avenue—the Oxford-street end—and adjoins the French Protestant Church.

The site was originally acquired by Sir H. W. Peek, Bart., for the erection of a Huguenot Institute, but in consequence of the refusal of the London County Council to sell the freehold, the project was abandoned.

The site has now been taken by Mr. Henry Bailey, of Highbury, and the present building is in course of erection. It will contain shops and basements, with four floors of residential flats, which will be entered by a separate entrance near the French Protestant Church.

Each suite will be lighted from the surrounding streets, and not by areas. By careful planning the site has enabled this to be done.

The building will be of red brick, with stone dressings and slated roofs, the pilasters to the ground floor being of polished Aberdeen granite. Mr. Charles Bell is the architect.

MUSEUM, BORDIGHERA.

THIS Museum has been built for the Rev. Clarence Bicknell, of Villa Rosa, Bordighera, in a cleared olive-garden, off the Via Romano.

Although primarily a Museum for the storing of botanical drawings, and specimens,—of which Mr. Bicknell has made and collected a large number,—of Roman remains from the excavations at Ventimiglia, and other things of interest, it is also intended it should be a miniature "Palace of Delight," wherein the townsfolk may enjoy spectacles and gatherings of one sort and another. There is a library in the gallery, and there is to be a kiosk for a band in the garden.

The building, with the exception of the dressings, entrance arcade, and coursed work, is of rubble, stuccoed and coloured. The stone is of the neighbourhood, and the brickwork lines that alternate with it are of the small red bricks of the country, with not too fine a joint. Below this work there is a broken frieze of pictures, with birds, beasts, and fowls of the air done in *sgraffito*. The roof is covered with plain Italian tiles. Inside, the walls are divided by colour into dado, filling, and frieze, and designs are being painted thereon by Mr. Bicknell. The ceiling is flat, displaying the beams, and coffered by pieces filled in. The fireplaces are bold, with stone lintels and high brick hoods, crossed by shelves with coloured pottery, and brick jambs, lined with large green tiles.

The architect, Mr. C. J. Tait, of Exeter, is indebted to Signors Gastaldi, engineers, and Giovanelli, builder, for their assistance in the carrying out of the work.

HOUSE FOR THE BELLAGGIO ESTATE.

THIS house is now nearly finished, being faced with red local bricks, and the roofs covered with Broseley tiles. The woodwork is painted white.

The architect is Mr. R. A. Briggs.

WROUGHT-IRON LAMP BRACKETS.

THE smiths of the last century have produced some very fine specimens of wrought-iron work, and the lamp brackets illustrated are interesting proofs that their inventive faculty was equal to the necessities of the age. No. 1 is one of a pair to the town house of the Gurforths, in Micklegate, York, an old Yorkshire family, now, I believe, extinct. Nos. 2, 4, and 5 are to houses of more or less importance in the same street. No. 3, now at the Manor House, or School for the Blind, until recently formed part of the railing to the Mansion House, York, when it was sold as old iron in exchange for a modern "improvement," dependent on paint and gilding for its attractions. Nos. 6 and 7 are from Newark, and, though exceedingly simple, are none the less graceful and effective. The remainder are from Carlisle. No. 8 has recently disappeared. No. 9 occupies its old position to St. Cuthbert's Churchyard, embodied in a new scheme of wrought-iron railing. No. 11 was over the gateway to Mushroom Hall, in Fisher-street, a house of some historical importance, now swept away by the tide of modern improvements; fortunately the ironwork has been saved from the marine-store dealer, and is now over the gate to the residence of Chancellor Ferguson, in Lowther-street. No. 13 occupies a new position in the Green Market. It is rather difficult to account for the Y-shaped arrangement in Nos. 8, 10, and 12; a rest for a ladder is out of the question. Both York and Carlisle, until the close of last century, had their town residences for the county gentry, and there are numerous examples of leadwork bearing their crests, panelled rooms and ceilings, and picturesque gables, reminding us of a past when individual work was recognised and flourished accordingly.

J. W. BENWELL.

BROMLEY COLLEGE, BROMLEY, KENT.

The two illustrations of this interesting though exceedingly simple bit of old school architecture are from sketches by Mr. A. C. Breden.

THE ENLARGED COUNCIL CHAMBER AT SPRING-GARDENS.

THE London County Council will re-assemble next Tuesday, after the Easter recess. The members will then sit for the first time in the enlarged Council Chamber at Spring-gardens.

When the Council succeeded, in March, 1889, to the Metropolitan Board of Works, it found the premises in Spring-gardens, which had been barely sufficient for the work of the Board, manifestly inadequate to its own larger requirements. In particular, the Board Room, which was part of the design of the late Mr. Fredk. Marrable, the first Architect to the Board, and which in the first instance was intended for forty-five members,—a number that was afterwards increased to sixty,—could only just contain, but by no means accommodate, the 137 members of the Council. The Council, by the courtesy of the Corporation of London, obtained the use for a limited period of the Council Chamber at Guildhall, and directed the preparation of designs for alterations, the chief object of which was the provision of an

adequate Council Chamber, with such additional Committee-rooms as would admit of the whole of the business of itself and its Committees being carried on at Spring-gardens.

The new Chamber has been formed by removing the north wall of the old Board Room, slightly lengthening the end walls, and adding a semicircular space beyond the line of the former north wall. The Chairman's seat is now placed in the centre of the old south wall, which remains undisturbed. The size of the Chamber is about 50 ft. across the straight side, and 52 ft. from the latter to the centre of the semicircular wall, thus making it about twice the size of the old Board Room. The daïs or Chairman's platform extends along the south side, and the Press gallery (which is much more commodious than its predecessor in the old Board Room) is constructed at a higher level over the rear part of the daïs; it is approached by the main staircase and members' lobby, and thence by a new short flight of stairs.

The floor of the body of the Chamber has been sunk to the extent of 1 ft., making the height 30 ft.; and the seats for the members rise in four tiers, following the course of the semicircular wall. They are massed together in seven separate blocks, and so arranged that from every seat a very large proportion of the members (from one-half to two-thirds) can be directly addressed by a speaker. The six radial gangways and the semicircular ambulatory or corridor at the rear, under the public gallery, are so planned that no member need pass more than two other members in order to reach his seat, or to pass from one side of the Chamber to the other. The ambulatory or corridor referred to has its two ends in the division lobbies right and left of the Chair, and is entered from the rear of the Council Chamber by two doors.

The seats are of American walnut, covered with maroon morocco leather. They are provided with elbows, and in front of each is a ledge for paper, pens, and ink. The floor generally is covered with dull green "Napier" matting, that under the seats being covered with green drugget laid upon felt. The walls are hung as a temporary measure with maroon hangings. On the floor of the Chamber in front of the platform is a table for the Clerk, the Solicitor, and the other officers of the Council who require to be in attendance at the meetings.

Behind the seats of the members, and on a higher level, is a public gallery for about 150 persons, accessible by a separate entrance reached from the gateway adjoining Messrs. Stanford's premises in Cockspur-street, and not from Spring-gardens, as formerly,

Two new committee-rooms have been provided, one of which will be used as a tea-room during meetings of the Council. There is also a suitable provision of lobbies and lavatories accessible from the corridor that adjoins the Chamber. The ground-floor of the new building is entirely devoted to the accommodation of the official staff, replacing some small and ill-lighted rooms that before existed.

The Council Chamber is well lighted by day by skylights and windows, and the artificial lighting will be by electricity, supplied by the London Electric Supply Corporation, Adelphi-terrace, and fitted up by Messrs. Strode, of Osnaburgh-street, in addition to the provision of gas by means of three sunlights. The electric light fittings include one eleven-light and eleven six-light electroliers suspended from the ceiling, and a few two-light brackets over the daïs.

The whole of the works are being carried out from the designs and under the superintendence of Mr. Blashill, the Architect to the Council, who is to be congratulated on having produced, at a small cost, a very convenient, well-lighted, and effective Chamber. He has been somewhat fettered by the necessity of preserving three sides and the roof of the old Board Room untouched, or the result would no doubt have been even better than it turns out to be; as it is, he has managed to make the four new columns which divide the semicircular public gallery into five bays range fairly well with the existing pilasters on the opposite (flat) side of the Chamber over the new Press Gallery. The enlarged Chamber in Spring-gardens will (apart from the convenience of its situation in the midst of the Council's offices) be found a much more satisfactory place of meeting for the Council than the costly Council Chamber of the Corporation of London. It is well lighted by day, ample provision has been made for warming and ventilation, and it will surprise us if its acoustic properties do not prove to be much more satisfactory than those of the Guildhall Chamber. But at best it is only regarded as a temporary expedient. The time will no doubt come when the Council will find it to be advisable and necessary to build new and adequate premises for itself and its large staff. Already the central premises at Spring-gardens cannot accommodate all the departments of the Council's work, and separate houses in Spring-gardens and Craven-street have been taken on short leases to receive the overflow. But with its enlarged Chamber the Council will be able to "rub along" at Spring-gardens for a few years to come, and in the interval it will be able to form a mature estimate of the permanent accommodation which it will require, and will sooner or later have to obtain.

The contractors for the general works are Messrs. Allen & Sons, of Palmerston-road, Kilburn. The furniture is by Messrs. Hampton, of Pall Mall East. The ventilating, heating, and gas-lighting of the Chamber are by Messrs. Verity, of Regent-street. The electric-lighting fittings, as before mentioned, are by Messrs. Strode, of Osnaburgh-street; and the structural ironwork is by Mr. A. D. Dawnay.

A sum of about 10,000*l.* in all has been allocated by the Council for the different branches of expenditure in connexion with the enlargement of the Chamber, and that amount will cover the cost.

REGISTRATION OF ARCHITECTS.

Sir,—The measure for the registration of architects is stated by its promoters to be intended at once for the protection of the public and the good of the profession. It would be unfair to say that these laudable objects are merely the stalking-horse, behind which lurks an unconfessed spirit of exclusiveness, and I am far from doing so; but, in admitting the sincerity of those who are moving in the matter, it is impossible to view without regret the inherent selfishness of their demand, or to refrain from asking, in the simple spirit of inquiry, in what way the public need, or will find, protection?

Can it be seriously suggested that the man who wants a house built goes, as he would go to the nearest chemist, to the first door on which he sees an architect's brass plate, and puts himself confidingly and unreservedly into the hands of the *genius loci?* Does he not go to a connection, a neighbour, to some one whose work he has seen and liked, or, failing all these, to a man of established reputation. It would be a poor compliment to the world of "clients" to hold the former supposition.

But for the people at large, for the poor and the ignorant, what can ensure them immunity from insanitary surroundings short of an Act of Parliament making illegal the erection of any building not supervised by a registered architect, even if that would? Will the leopard change his spots, the jerry-builder his skin, because he sees the architects being drilled and put through their paces? He is hardly likely to beg to be reformed in consequence of it. People go to their relations, it is said, when they want work done. Why not? and will they do so less because the relation happens to be unregistered? It may be doubted.

Materially speaking, registration might benefit the profession; commissions would be more readily recoverable in a court of law, and appointments go to a rather larger percentage of those in practice; but, in any other than a material sense, would the result be satisfactory?

A qualifying examination is undeniably a test of education, up to a certain point, and it is not open to some of the objections which are taken to competition, pure and simple, but too much reliance may easily be placed in what it is taken to prove.

There is such a thing as cramming—"an exchange of knowledge for a diploma"—when the revulsion from forced labour opens the tap and lets most of the information trickle out again. There is again a faculty for passing examinations—mimetic rather than reasoning—the possessor of which is not necessarily competent to carry out what he can write about, nor, in in any case, is the candidate's practical power of judging between good and bad work, and varieties of material, properly tested.

Still, *cæteris paribus*, the man whose knowledge has been tested by examination is in a better position than he who has not submitted himself to the test, and may reasonably reap some benefit from it. The point where examination fails is, of course, that at which architecture ceases to be a profession and becomes an art. To be unpractical is not to be artistic, but there are some men who, without the gift of acquiring accurate knowledge, may possess genius for beauty of form and disposition. Such men are usually quite alive to their want of thoroughness where it exists, and might be trusted to supply it from other sources, but the purely practical man asks to have them tabooed, and does so without any apparent consciousness that, practical as he is, he is asserting the half to be more than the whole, and himself to be that half. The closely-trimmed hedge is very well in its place, but there are some who prefer the natural growth of graceful tendril and flowering shoot, and view with proportionate dislike the mechanical lopping of the hedge-cutter.

If Parliament sanctioned registration at this moment, which it is hardly likely to do, we should be in the position of men who, acting under a momentary impulse, have rivetted their own chains, turned the key in the padlock, and thrown it into the sea. There it would rust into nothingness, and no hand would ever be stretched out to loose our self-imposed fetters.

A. E. Street.

Sir,—Considerable anxiety prevails amongst the loyal members of the Institute as to the future of the profession, though I fancy there is no need for alarm. The idea that "Registration" will advance architecture cannot for a moment be seriously entertained. As Professor Aitchison pertinently reminds us, most of the best work in the past has been done by men educated for something else.—How devoutly we may wish that many educated for the profession would betake themselves to some other!—An architect is born, and cannot be made by Act of Parliament. The many subtle refinements which go to make good architecture, relate to plan, design, and constructive skill; to each there is added something which lifts it beyond mere convenience in arrangement, beauty in design, or strength in construction. No amount of examination will insure this product.

In many a man these powers may be latent or lie dormant until opportunity calls them forth, and the direction of the examination should be to arouse enthusiasm. But a large proportion of young men who enter themselves can never rise to any proper standard, and here compulsory examination may step in to hinder the waste of time and life in the pursuit of an art which is beyond their reach. The man of genius may be rare, but men of talent are numerous, and there is room for those capable at least of doing work which may fairly be entitled architecture; but from the genius downwards all require education, and though you cannot make an artist, by examination you can stimulate and test his study with advantage to himself as well as the public.

Admitting the principle of examination, the quantity and quality of it is a problem worth considering. Professor Aitchison draws attention to one evil of the method adopted in Austria; and both in Germany and Denmark, where the tests are severe and the course arduous, the results are alike disastrous. While much of the modern work is strictly academic and proper, all "life" seems to have been smothered, and, as a consequence, any development or advance has been prevented.

The object of the examinations should be to help artists, and not to turn out good builders or clerks of works, but to give too great a predominance to mere scientific branches would be sure to have this effect.

It is a mistake to look upon examination and registration as a means of protecting the public, and the advocacy of registration on that score is delusive. The only way to protect the public by legislation is to make jerry-building criminal. If bad drainage or shoddy materials, or faulty construction which endangered life, were punishable, the public would be sure to employ only those duly qualified; and the architect would take care that he knew his business, and be thankful to the Institute examinations, which direct his studies and secure him a recognised position.

John Belcher.

20, *Hanover-square, W.*, April 14, 1890.

THE OLD QUESTION: "WHAT IS AN ARCHITECT?"

SIR,—Before the question of registration goes any farther it is as well to understand what an architect is and what he is not.

In the opinion of some of the speakers at the Institute meeting an architect is a "member of a learned profession," "the servant of the public," "nothing if he is not practical," and architecture is a business about which "there is a certain amount of fine art more or less." We all know that a certain section of the public hold this view of architects and architecture; but surely even the most humble "servant of the public" has at any rate a vague idea that architecture is an art and not a matter of "light and air," drains, diameters of cast-iron columns, and the like, and that an architect is an artist and not a sort of compound animal, partly builder, partly laywer, and the rest policeman, to see that the builder does not cheat.

Of course, if architecture is a learned profession, and architects learned professors, let them be examined, found correct, and registered without loss of time.

It is an old remark that building is not necessarily architecture, but apparently this truth is not generally accepted, and many seem to think that building, *at any rate when it is ornamented*, is architecture.

An architect must possess a very considerable amount of technical knowledge, but this is a means to an end, not the end itself. By all means let the Institute examine, and give certificates of proficiency in technical knowledge; but let us, once for all, face the fact that it is the one quality which makes an architect which cannot be tested by examination.

Let people once realise what an architect is (and in order to do this architects must make haste to realise what they are meant to be themselves), and there will be no necessity for registration; only those who are fit to do the work will get the work to do; the "business architect" must call himself by another name, and the "undertaker architect" can bury himself.

Finally, let our endeavour be to get altogether out of our minds the "learned profession" idea, and remember that the only reason for our existence is that we may, in the words of the Architectural Association motto, "Design with beauty, and build in truth."

ERNEST NEWTON,
MERVYN MACARTNEY,
JOHN BELCHER.

DAMAGE TO GAS-PIPES BY STEAM ROLLERS.

SIR,—I shall be obliged to any of your readers if they inform me of a case which will strengthen me in resisting a claim by a Gas Corporation against a Borough Corporation for damage done to their gas main by a steam-roller engaged in rolling a coating of metal upon a macadamised street. I understand that a case occurred in London about two years ago, when it was held that the Gas Company was bound to prove that their main was laid sufficiently deep to resist legitimate pressure from the surface. Definite information will oblige.

A BOROUGH ENGINEER.

CONDENSATION WATER IN STRONG ROOMS.

SIR,—I shall feel obliged if you, or any of your readers, can inform me through the columns of the *Builder* what is the best method for keeping a strong-room free from condensation water.

In the autumn of 1888 I built a strong room for a firm of solicitors, attached to the main building, but three sides being exposed. Walls 17 in. thick with an air-space between kept ventilated by air bricks; roof arched over in three spans with white bricks, the centre span being glazed bricks; the covering to roof 1 in. asphalte.

The walls are thoroughly dry, but water caused by condensation collects on the underside of the roof in such quantities as to render the strong-room practically useless for storing deeds and valuable papers.

A gas-jet is kept burning all day and night, and the iron door is left open during the day.

E. A. EMOOR.

[Was the damp noticed *before* the use of the gas-light?—ED.]

CHARLES SMITH & SONS (LIMITED), *v.* KIRK AND RANDALL.

SIR,—In your issue of March 15, you published a letter from Messrs. Kirk & Randall's solicitors, in which they stated their intention to appeal against the decision in our favour given by the Brompton County Court Judge*

We have received a letter from our solicitors, Messrs. Ingle, Cooper, & Holmes, stating that Messrs. Kirk & Randall have withdrawn the appeal, and paid costs.

This case being a matter of interest to the architectural profession and the trade generally, we thought you would like to know the final result.

At the same time, we have to thank you for the interest you have taken in the matter, and your able explanation of the facts given on March 15.

CHAS. G. SMITH, Managing Director.

OBITUARY.

Mr. J. A. P. M'Bride, Sculptor.—We hear with regret of the death of Mr. John Alexander Paterson M'Bride. According to the *Liverpool Mercury* he was born in February, 1819, and was the son of the late Archibald M'Bride, of Campbeltown, Argyllshire. His mother was a M'Kenzie, and his grandmother a M'Kinnon, so that, as he was fond of saying, every drop of blood in his veins was Celtic. At an early age Mr. M'Bride entered the studio of the late William Spence, of Liverpool, the friend and fellow pupil of John Gibson, R.A. At the Liverpool Art School, then held in Duke-street, he studied drawing along with Richard Ansdell, R.A., Samuel Huggins, and others of note, carrying all before him in the way of medals and prizes. After completing his time with Mr. Spence, Mr. M'Bride removed to London, where he became a student at the British Museum. It was at this time that he modelled his life-size group of "Margaret of Anjou and her Son," which was exhibited at the first sculptural contest in Westminster Hall, and highly commended by the judges, one of whom, the late Samuel Joseph, R.S.A., the sculptor of the Wilberforce statue in Westminster Abbey, and of the Wilkie in the National Gallery, was so struck by the work that he took Mr. M'Bride into his studio as premier pupil and manager, foregoing, on account of the excellency of the group, his customary fee of 500 guineas. After leaving Mr. Joseph, Mr. M'Bride returned to Liverpool, where he took an active part in the art movement then going forward, headed by the members of the Liverpool Academy. He became their honorary secretary in 1852. Among his chief works are the marble bust of the late Field-Marshal Lord Combermere, ordered by the Freemasons of Cheshire; his competitive model for the Wellington Memorial in St. Paul's Cathedral; a colossal statue of the famous Biblical commentator, Dr. Adam Clarke, ordered by the Wesleyan body; full-size statues of the Four Seasons, in front of Garswood Hall, the seat of Lord Gerard; group of "A Mother and Child"; half-size statues of Sir William Wallace and of the Duke of Wellington; bas-relief in Rock Ferry Church from the words, "Come ye blessed of My Father"; bas-relief in Birkenhead Church from the words, "Visit the sick and the afflicted"; a heroic-size bust of the late Mr. John Laird, M.P., in the Borough Hospital, Birkenhead; and many busts. Mr. M'Bride's last work is the statuette of Mr. H. M. Stanley, which is now being published by Messrs. Minton. The first copy of this work reached Mr. M'Bride only a few days before his death, and was shown to him on his death-bed. Mr. M'Bride was a lecturer of much ability, and of late years, his health not permitting him to undergo much of the fatigue of his profession, he devoted a good deal of his time to lecturing on sculpture, and delivered courses to large audiences at the British Museum and Crystal Palace and for the Corporations of Liverpool, Bradford, and Greenock. He removed to London some seven years ago, and his health failing, early last year he left London for Southend-on-Sea, where, after a painful illness, he succumbed to a malady from which he had suffered for many years.

Mr. T. C. Noble, F.S.A.—Mr. T. C. Noble, F.S.A., a well-known antiquary, died recently. He was an old contributor to the columns of the *Builder*, and was of late very closely identified with the Ironmongers' Company, of which Guild he was compiling a history at the time of his death. He will be remembered also for his efforts to secure reasonable facilities of light for those engaged in searches at the Public Record Office, where a few years ago searchers were much hampered by regulations of the "red-tape" species.

* See report in *Builder* for March 1, p. 158:—"A Claim on a Bill of Extras."

The Student's Column.

ELECTRICITY, MAGNETISM, AND ELECTRICITY SUPPLY.—XVI.

SERIES-WOUND DYNAMO-MACHINE.

IT was not until some twenty years after the construction of the first dynamo-machine that the idea was conceived, obvious enough as it appears now, of making the current produced in the armature excite the field magnets. The whole, or a part only, of the current may be used for this purpose.

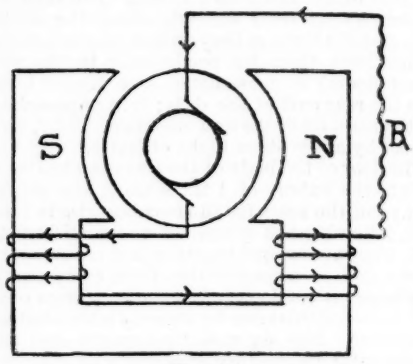


Fig. 40.

Fig. 40 shows the connexions between the armature and field-magnet coils in a "Series-wound Dynamo-Machine." That is a machine in which the armature coils are placed in series with those on the field-magnet cores, so that the whole of the current given by the armature flows through them.

The characteristic of a series machine is very different in shape from that of a separately excited dynamo, fig. 39, as the strength of the field produced by the magnets rises continuously with increase of current from the armature, and consequently the line N s_8, fig. 38, varies with the currents c_1, c_2, c_3, &c., though not directly with them, but according to the law of the electro-magnet, article X, otherwise the characteristic would simply be a straight line passing through the origin of the curve. Different as are the two curves, yet with a supplementary curve, fig. 41, to determine the length of the diameter N S_0, fig. 38, in each case, precisely the same construction as that explained in the last article will enable us to determine the general form of the characteristic for the series machine. In fig. 24 a curve was given showing the connexion between the M.M.F. and flux produced through an electro-magnet. Fig. 41

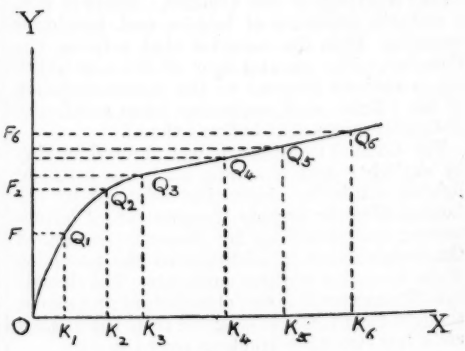


Fig. 41.

represents a very similar curve for the field magnets of the series machine, fig. 40. The lengths O K_1, O K_2, &c., set off on O X, are proportional to the ampere-turns or to the currents c_1, c_2, c_3, which flow from the machine, running at a constant speed, when R is varied, while O F_1, O F_2, . . . O F_6, measured along O Y, are the corresponding strengths of field produced in the direction N S, fig. 40, thus determining a series of points Q_1, Q_2 . . . Q_6, through which a curve can be traced, giving the relationship between the current through the coils of the field-magnets and the strength of field in the direction N S, fig. 40.

In fig. 42 these strengths of field are set off as N_1 S, N S_2 . . . N_6 S, and semicircles are drawn with these latter lines as diameters. From S mark off a series of chords S S_1, S S_2 . . . S S_6 proportional to the fields produced by the armature currents, in the direction of the diameter of commutation, that is, lines propor-

tional to the currents c_1, c_2 . . . c_6; then N_1S_1, N_2S_2 . . . N_6S_6 will give the resultant field in each case. Figures 38 and 42 are really the same constructions, except that in fig. 38 the strength of field produced by the magnets was constant, so that NS_0 was the same for all

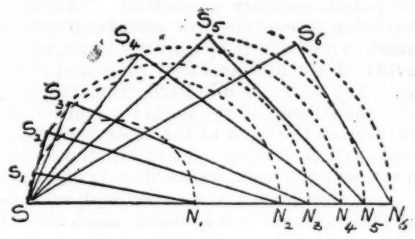


Fig. 42.

currents in fig. 38, while the corresponding line varies when the current changes in fig. 42. The construction of the characteristic can now be proceeded with in precisely the same manner as before.

Along O X (fig. 43) the currents OC_1, OC_2 . . . OC_6 are set off, and along O Y, lengths OE_1, OE_2 . . . OE_6 proportional respectively to N_1S_1, N_2S_2, N_3S_3 . . . N_6S_6, fig. 42, since electro-motive force, at constant speed, is proportional to strength of resultant field.

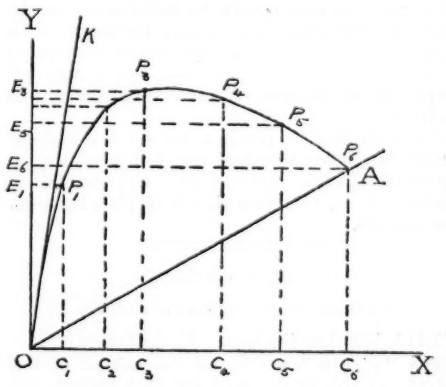


Fig. 43.

The points P_1, P_2 . . . P_6 being determined, the characteristic can now be drawn. The same letters in figs. 39 and 43 have corresponding meanings, and the two should be carefully compared, O A in the present case being the resistance line for the field-magnets, in addition to that of the armature.

A very curious property of the series machine can be seen from fig. 43. Suppose that R is increased until the resistance-line turns into the position O K, that is to say, a position in which it is the tangent to the curve at O. Then, although the resistance in circuit is only tan K O X, the machine gives no current. This resistance is called the "critical resistance," and varies with the speed of the armature. It can also be seen that if speed is sufficiently reduced, the curve sinks below O A, so that O A is the tangent to the new curve at O. In such a case the machine gives no current, even when short-circuited; there is, therefore, a speed below which a series machine is unable to give any current at all. For every speed, then, there is a "critical resistance," and for every resistance there is a "critical speed."

It must be noted that in the constructions given above no account has been taken of the fact that the core of the armature, being of iron, the value of μ for it also varies, tending to become 1, the effect of which is to flatten the characteristic. A glance at fig. 42 will, however, show that unless there is very little iron in the armature, it will never really approach saturation-point, and that it would be needless for our purpose to complicate the constructions to correct an error, on this score, which is practically non-existent.

SHUNT-WOUND DYNAMO-MACHINE.

When the field-magnets are excited by a part only of the armature-currents, the field-magnet coils are placed as a "shunt" across the brushes, fig. 44, and share the current with the external circuit R. When this method of excitation is employed the name "Shunt-wound Dynamo-Machine" is given. If the two machines, figs. 40 and 44, are to deliver the same amount of power into the external circuit, the field-magnets must be equally excited in both—in other words, the same number of ampere-turns must envelope the limbs of both magnets. If this is the case, and the winding in both machines occupies the same volume, the same amount of power is absorbed by both fields. In the series machine the whole of the current and a small

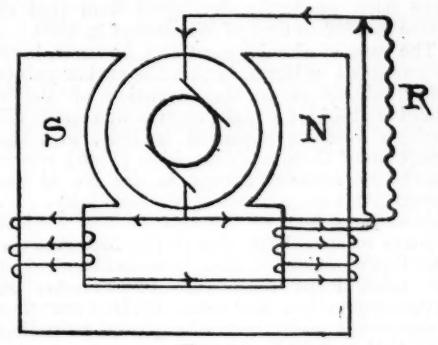


Fig. 44.

part of the electro-motive force is used. In the shunt machine the whole of the external electro-motive force and a small part of the current is used. But the product E C is the same in both cases; the number of turns of wire employed varies directly as the electro-motive force used, and inversely as the current flowing through them.

Books.

Handbook to the Mediterranean; its Cities, Coasts, and Islands. For the Use of General Travellers and Yachtsmen. By Lieut.-Col. Sir R. LAMBERT PLAYFAIR, K.C.M.G. Third edition, revised. London: John Murray, Albemarle-street. 1890.

Handbook for Travellers in Algeria and Tunis. By Sir R. LAMBERT PLAYFAIR, K.C.M.G. Fourth edition, thoroughly revised. London: John Murray, Albemarle-street. 1890.

NO branch of general literature has been marked by greater progress during the last twenty years than that relating to handbooks or guides for travellers. The old road-book that did duty for so many decades, indicating the position and distance of turnpike and tavern, church and forge, was superseded, in the earlier days of railway locomotion, by a class of works in which hotel tariffs and cab fares were freely intermixed with scraps of descriptive poetry, and padded with information that was rarely accepted as trustworthy. Higher education and constantly-increasing facilities for visiting every part of the habitable world have created a demand for a class of literature that had no existence in a previous generation. More than this. The eagerness to acquire knowledge with a minimum of trouble, and the impatience that rebels against studious investigation, have called into existence a class of books in which a mass of useful and trustworthy matter is placed before us in a handy and concise form. It was a new departure to issue ten years ago a handbook to the Mediterranean for the use of general travellers and yachtsmen. The wisdom of the step and the success of the undertaking are marked by the issue of a third edition, thoroughly revised up to date. To condense within the limits of two handy little volumes a reasonable and reliable amount of information regarding all the countries in the vast basin of the Mediterranean, including such inland excursions as the average traveller would naturally make from its ports, is a creditable undertaking, and fairly merits the success it has already achieved. It might be expected that so keen an observer of the monuments of antiquity, and so diligent a student of antiquarian literature as the accomplished author of this handbook, could not fail to satisfy the expectations of the architect and the archæologist. A glance at the pages of these volumes is sufficient to show that their expectations are realised, and that every endeavour has been made on the part of the editor and his fellow-workers to secure accuracy without losing sight of the great desideratum of a handbook—practical utility.

Irrespective of the revision to which previous editions of this work have been subject, parts having been re-written, the attention of travellers is specially directed to the chapters relating to localities insufficiently described before, such as the coast of Africa, Greece, Dalmatia, Cyprus, Malta, Sicily, Sardinia, the Balearic Islands, and the too little known island of Corsica. Detailed descriptions of places of interest and of monuments of antiquity are out of place in any handbook, especially in a work which is mostly an epitome of matter extracted from other handbooks or works of recognised value. For instance, a traveller making an excursion to Delphi would not expect to find a minute account of the remains of the first temple of which this was the fifth erected there in honour of Apollo; that the names of the architect and the contractors are still on record; that the building was constructed with local limestone; and that, according to Herodotus, the white marble columns of the portico were the gift of the contractors. Nor, in the excursion to Eleusis, would the average traveller care to know that the plan of the vast temple of Ceres was more like that of the hypostyle halls of Egypt, and that the form of the edifice itself remains as much a mystery as the Eleusinian mysteries, for the celebration of which it was designed. Nor would he look for more than passing allusion to the remains at Olympia, of which the best description may be found in Adolf Bötticher's little octavo volume. A few footnotes referring to this and some other recent works would have added to the value of many of the pages in this handbook. The chapter on Dalmatia has been mostly re-written, but it would have been as well if more notice had been taken of Mr. T. G. Jackson's scholarly work on the architecture of that country. The sculptured west doorway of the Duomo at Träu, which will hold its own for beauty and richness of detail with any portal of Romanesque design, deserved more than passing mention. Respecting the great campanile at Spalato, the most important specimen of Dalmatian architecture of the fourteenth century, the handbook informs us that it was commenced in 1416 by Marie, Queen of Naples, and only finished during the last century. This latter statement is true in respect of the octagonal lantern, but there is little doubt that the tower itself was begun at the commencement of the fourteenth century, and completed in 1416. In the foot-notes referring to standard works on this part of the Mediterranean, no notice has been taken of Le Cassas' magnificent volume, entitled, "Voyage Pittoresque de l'Istrie et Dalmatie," fol. 1802. Whether this was intended to supplement Adams' great work, published some twenty years previously, is doubtful. Many of the illustrations, some fifty in number, are very beautiful, and those relating to the architecture of Diocletian's palace are worthy of reproduction, as examples of the transitional phase of Roman art. The original water-colour drawings, of high artistic value, may still be seen on the walls of a library in Bedford-square. The chapter on Sicily is an outline of the matter contained in Murray's handbook for South Italy. Why the remarkable monumental remains of the Greek city of Acragas should be styled as appertaining to the insignificant Roman town of Agrigentum requires explanation. This is an error that has crept into most handbooks. The city of Acragas, although the latest of the Greek cities of Sicily, was for more than three centuries one of the strongholds of the Mediterranean. The six centuries of occupation by the Romans have left so few traces of their presence that it is fair to presume this old Greek colony was neglected till the invasion by the Normans in the eleventh century.

The success of the last edition of the "Handbook to Algeria and Tunis" has induced the publishers to issue another revise under the same experienced editorship. The knowledge and enthusiasm which prompted Ford many years ago to write for the benefit of travellers in Spain the best handbook of his time, or indeed of any time, are equally conspicuous in the volume before us, and it would be difficult to name any other work of the kind where more care has been taken to ensure accuracy of description throughout all its pages. Railway communication has now placed the chief points of interest within easy access of London, and excellent roads to the military stations in the interior, as far as the Desert line, offer as many facilities to the pleasure-seeker and the student as are to be found in most parts of Europe. There is no country that possesses such abundant traces of every stage of civilization as the region described in this handbook. In the Museum at Carthage the traveller will find a varied collection of early Punic sculptured remains:—The disc of Baal, "the abomination of the Sidonians," the upright hand, the crescent of Astarte, palm trees, rams, and other

symbols of long-forgotten creeds. On the coast below Mahadia he may explore the tombs of still earlier settlers, far back into pre-historic times. Inland, almost wherever he turns, he may study the monuments of the long and prosperous period of Roman dominion, and the short rule of the Byzantine Emperors. From the borders of Tripoli to the holy city of Kairouan, and westward up to the pillars of Hercules, he may trace the march of the victorious Arabs. In Tunis and Susa, and Sfax and other towns, he may note that the arts and crafts of this once conquering race, notwithstanding long centuries of decay and misrule, are not yet wholly extinct. And at Tlemçen, hitherto neglected by the architect and the archæologist, he will find admirable specimens of Moorish art not surpassed, except in grandeur of scale, by any of the better known work at Granada or Seville.

Electrical Influence Machines. A full account of their Historical Development and Modern Forms, with Instructions for making them. By John Gray, B.Sc. London: Whittaker & Co., 1890.

In his preface the author states that "In the present work an attempt has been made to bring together in one volume all that is useful and interesting about Influence Machines. In the first part is given a sketch of the elements of static electricity sufficient, it is hoped, to make the reader independent of a text-book on the subject, and at the same time, in such a form as will enable those with little mathematical knowledge to understand the nature of electrical quantities. . . . In the second part, the history of the Influence Machine, from its earliest known form up to its modern forms, has been given. . . . The construction and working of all the important machines, have also been described in this part of the book." Those who are familiar with electrical theory and measurement may omit reading Part I. without missing anything necessary for the proper understanding of the subsequent portions of the book, though the author is happy in his treatment of this well-worn branch of the subject, and, in places, original. After giving "The Experimental Data of Static Electricity," Mr. Gray devotes a chapter to "A Working Hypothesis of the Electric Field." A dialectric is represented by a collection of cells, with elastic walls, filled with incompressible fluid, and the walls of these cells are bulged out in the direction of a line of force. "The potential at any point in an electric field or strained dialectric is the pressure in the cell in which the point lies." How far such a hypothesis will assist the average reader is an open question, but the definition or explanation of E. M. F., which the author deduces from it, is altogether unwarrantable and calculated to lead a beginner into hopeless confusion. E. M. F. is defined as "the rate at which the potential decreases," that is, E. M. F. is defined as though it meant "electric force" and not "electro-motive force." Electric force and electro-motive force being totally different things, we are at a loss to understand how Mr. Gray can have committed such a blunder. In the next paragraph it is stated that E. M. F. at "points" on a conductor would be infinite, and "this explains the discharging effects of points." Considering that the letters E. M. F. are now universally used to mean something quite different from the above, Mr. Gray ought at least to warn his readers that he is attaching a new signification to them.

The final chapter of Part I. is taken up with very full descriptions of Sir William Thomson's well-known electrometers and a brief description of one of his volt-meters. As the most important step in the progress of every science is the measurement of quantities, the reader may reasonably expect, after reading through some twenty-five pages of detailed descriptions of instruments for measuring potential and current, that the actual performances of the influence machines about to be described will be given. Such, however, is not the case; qualitative results, not quantitative, alone are recorded except in one or two cases.

Part II. begins with the description of an electrophorus, given by Wilke in 1762, and in due course details are given of the influence machines of Belli, Bertsch, Bleekrode, Bohnenberger, Cavallo, Carré, Clarke, Clerk Maxwell, Goodman, Hachette and Desormes, Holtz, Kaiser, Kundt, Leyser, Musaeus, Nicholson, Poggendorff, Riess, Righi, Ronald, Ruhmkorff, Thomson, Töpler, Varley, Voss, Wilson, Wimshurst, Wimshurst-Holtz. This list will indicate the amount of information about this type of electrical machine that Mr. Gray's little book affords; and it is extremely interesting to note how, and at what rate, influence machines have been gradually developed from that of Wilke in 1762 to that of Wimshurst in 1890.

The rate of development has, however, been by no means uniform, for, as the author points out, "subsequent to the invention of Bell's machine [1831], no real progress was made till Varley's machine appeared in 1860, with the exception of Goodman's machine [1840], which showed no advance except in the use of uncoated glass as a carrier of electricity. . . . This sudden loss of interest in the subject appears to have been due to the fact that the attention of scientific men became absorbed in the magnificent discoveries of Faraday in electro-magnetism and other kindred branches of electricity, which covered a period extending from 1831 to 1857."

It is needless to say that in some of the older forms of machines curious devices appear. In one of Töpler's machines a sort of electrical safety-valve, consisting of two points opposed to each other, the distance between which can be adjusted, is introduced "to prevent the difference of potential becoming so great as to cause internal sparking in the machine." Some instructive figures are given in connexion with the great Töpler machine. "A machine with 20 discs, each 26 cm. diameter, the axis of which made 22 revolutions per second, with an expenditure of 4 kilogrammetres of work, supplied a current of electricity of 0·0081 absolute units, when measured by passing the current through a U-formed glass tube filled with water and a tangent galvanometer."

The author has himself made some interesting experiments on the Holtz machine by substituting tin-foil for the usual paper armatures. "Tinfoil sectors subtending an angle of 20 deg. were found to answer, while it was found that the machine would work with paper sectors of about one-half that length." The Bleekrode Machine appears to be a very remarkable one, and we wish the author had allowed more space to it. It is a modified Holtz, with vulcanite instead of glass discs. "Contrary to the usual practice, the electrodes of the machine must not be in contact when the machine is started. But the most interesting points are in connexion with the neutralising rod. It has been found that a machine such as this, having vulcanite discs, will not work at all without the neutralising rod . . . . the machine will cease to act, and all electricity will apparently disappear from it . . . . when the neutralising rod is again brought into position, the machine will commence to act as before." A final extract is made for the purpose of showing how little is really known as to the behaviour of influence-machines, owing to the apathy displayed towards them by modern electricians. "It has been observed that these Holtz machines of the 'second kind' are liable to die out when the electrodes are separated beyond the striking distance, though, according to other authorities, a reversal of the current takes place." It is indeed curious that so interesting a point as to the behaviour of a well-known machine has never been definitely settled. A chapter is devoted to the tiny machines of "the celebrated physicist, Sir W. Thomson," and Part III. gives pretty complete instructions for the practical construction of that most successful of modern machines, the Wimshurst, as well as of the Holtz and Voss machines.

The descriptions given throughout the book are excellently illustrated with eighty-eight figures and three plates. The matter it contains, collected, as far as we are aware, for the first time in a single volume, proves how much this branch of electrical science has been neglected and the immense field for original research offered by it.

SOME TRADE CATALOGUES.

Messrs. Doulton & Co., of Lambeth, have lately issued a very complete illustrated catalogue and price list of sanitary appliances. There are figured in it several novelties in the way of pedestal "combination" and other closets, as well as baths, lavatories, water-fittings, and urinals of an improved type, such as were provided by this firm for the *châlets* of the Paris Exhibition, where, we learn, they planned and fitted up 300 water-closets, 100 urinals, and sixty lavatories. Their new catalogue will be found very useful to architects and the building trade. Messrs. Doulton, we may add, have lately erected an additional manufactory for sanitary appliances at Paisley.

Messrs. Adams & Co., of York, London, and elsewhere, have sent us their new illustrated list of patent sanitary specialties. Amongst the novelties it contains we would call special attention to a new form of lavatory basin, which is devoid of the old-fashioned plug and chain outlet. The water is admitted from the rear, towards the bottom of the basin; a continuous current strikes the front of the basin, is directed upwards, and then flows back at the top of the basin towards the back, where there is an outlet weir. By this means the water can be continually renewed while it is being used, all dirt and foul matter being carried away at once. We may also mention Messrs. Adams's special disconnecting chamber, made of stoneware; their improved automatic flushing syphon; their patent revolving disc penstock, which is ingenious, and secures a tight fit as well as a quick and easy lift; and their patent "automatic" flushing-door, useful for large culverts, &c. These and other appliances in the list are well worth the attention of Borough Engineers and Surveyors.

Messrs. D. Hulett & Co., Limited, of Holborn, send us a copy of their illustrated catalogue of electric-lighting plant and material, which appears to be very complete, and cannot but be found useful by architects and builders. It is very well got up, and every article illustrated or described is priced, so that some approximate idea of the cost of an installation may be arrived at.

From Messrs. H. Binko & Co., of Leadenhall-street, we have received another useful catalogue of electric fittings and appliances, including bells, telephones, telegraphs, lighting, and motors.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

7,415, Window Sockets. C. J. Harcourt.

The "sockets" which are the subject of this patent are chiefly designed for shop-fittings, and are so made as to be easily fastened around any pillar or projection, and removable without being passed over the top, or permanently fixed.

20,914, Fireproof Ceilings and Walls. A. Klapperstuck and A. H. Meyer.

According to this invention, mortar and gypsum, with colophony and diluted acid, are mixed and applied as a plaster, which is thrown against a suitable fireproof backing, preferably a coarse-meshed wire netting. It is applied to both sides, and is smoothed off the usual way. The colophony remains in a neutral condition within the wall until subject to heat. When, however, a fire breaks out, the colophony will cause the wall to assume a glazed structure,* which renders it incombustible. This structure * the wall will always after maintain. The walls may be made very light and thin, waterproof, and poor transmitters of sound, and, moreover, the walls may be made in small portable sections.

1,525, Brick Kilns. I. Button and others.

In continuous kilns improvements are made, according to this invention, by the combination and arrangement of a series of separate arched compartments in connexion with a smoke-chamber and in the novel arrangement of a temporary and a permanent part of the kiln. The temporary parts are made of green bricks, and each compartment as it is filled is closed by a wall of green bricks, a sand filling, and an iron gate.

1,762, Railway Sleepers. R. Hirschberg.

This invention consists in a means for retaining metal sleepers in a proper position with relation to each other, and in locking devices for the same. The clamping devices are peculiarly arranged.

1,839, Windows or Casements. F. Schmidt.

This invention refers to means for preventing the said inner and outer casements from clashing together, or being thrown apart by influences such as the weather or the sudden opening or closing of doors. The frames for the two panes are so fixed that they are rigid, and always maintain a parallel position to each other. The socket is made by piercing a hole in the centre of the frame carrying the two panes.

1,868, Forming Holes and Screw-threads in Clay and Earthenware. G. Schönau.

According to this invention, mandrels used and forced into the holes in which the threads are to be cut, or sectional mandrels having removable dies, are pressed around the projectors on which the threads are to be made.

* "Structure" is the word used in the specification, but "surface" seems to be the word intended.

1,890, Drive Chains. T. Moxon and others.

The object of this invention is to produce a chain of pivoted links which shall be extra strong and simple in construction, and which may be easily shortened by the removal of links or lengthened by the insertion of new links without the employment of pins, screws, or rivets; the links being held together by simply keeping the chain taut. The links are formed in one piece, having a link at one end and a hook at the other, each link separating from the others. When it is desired thus to separate them, it is first loosened a little, and then the upper part is slid far enough to disengage its hook from the lower section, the eyes formed by the hooks being sufficiently elongated to permit this to be done.

2,200, Closing and Sealing Device for Discharge Openings. J. L. Bradley.

This device is for closing and sealing the discharge apertures of vessels containing liquids or gases, free or under pressure, to prevent leakage and setting fast by corrosion, such as occurs with ordinary cocks or taps, to ensure a certain and immediate discharge of the vessel when required, and to render impossible any tampering with the device without detection. It consists of a peculiarly shaped cover piece or plate, soldered or otherwise fastened over the discharge aperture.

2,326, Blind Furniture. J. Robertshaw.

According to this invention, a pivot, ratchet-wheel, spiral spring, and a screw nut are employed in combination to effect a tension of blind cord and even rotation of the blind roller.

*** Owing to the failure of the Patent Office to issue the official Journal of Patents last week, we are compelled to hold over the "New Applications," &c., until next week.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

April 1.—By MESSRS. COBB (at Rochester).

Kent, Cliffe—"Pickle Farm," and 26a. 0r. 37p., f., r. £67. 19s.	£2,000
F. cottage, laundry, and 3r. 18p.	500
F. plot of land in Wharf-lane, 1r. 27p.	35
New Brompton—41, Paget-st., f., r. £14	220

By ROGERS, CHAPMAN, & THOMAS.

Soho—183, Wardour-st., f., r. £120 p.a.	2,300
Chelsea—35 to 43 (odd), Upcerne-rd., u.t. 92 yrs., g.r. £34. 2s. 6d.	1,500
Brentford, near—1 g.r. of £100, u.t. 82 yrs., at a g.r. of £40 p.a.	1,140

APRIL 10.—By HENRY & LATCHFORD.

Kentish Town—L.g.r. of £75. 12s., u.t. 59 yrs., subject to a g.r. of £2. 5s.	1,485

By T. B. WESTACOTT.

Fulham—40, Bishop's-ter., u.t. 86 yrs., g.r. £6, r. £39.	210

By C. C. & T. MOORE.

Bow—1 & 11, Three Mill-lane, f., r. £35. 2s.	360
23 & 25, Three Mill-lane, f., r. £36. 8s.	320

By NEWBON & HARDING.

Hoxton—53 & 57, Harman-st., u.t. 52 yrs., g.r. £11. 5s.	900
Holloway—66, Tufnell Pk-rd., u.t. 74 yrs., g.r. £8, r. 46	505
48, 50 & 52, Hargrave Pk-rd., u.t. 76 yrs., g.r. £21	840
Pentonville—43, Wharton-st., u.t. 36 yrs., g.r. £4, r. £40.	255
Stoke Newington—144, Winston-rd., u.t. 70 yrs., g.r. £5. 10s., r. £30	290

By SLADE & BUTLER.

Battersea—4 and 6, Limbourg-rd., u.t. 90 yrs., g.r. £14	570

By REYNOLDS & EASON.

Bishopsgate-st.—30, Duke-st., f., r. £63. 5s.	730
Hackney—29, King Edward's-rd., u.t. 33 yrs., no g.r.	450
144, King Edward's-rd., u.t. 52 yrs., g.r. £6. 5s. r. £32	300
Old Ford—49, Arbery-rd., u.t. 60 yrs., g.r. £5. 10s. r. £28. 16s.	260
Hackney—11, 13, and 15, Mansford-rd., f., r. £75. 8s.	735
Walthamstow, Beulah-rd.—"Linden Cottage," f., r. £25	505
Snaresbrook, Sylvan-rd.—Two plots of f. land	150

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

MEETINGS.

SATURDAY, APRIL 19.

Royal Institution.—Captain W. de W. Abney, F.R.S., on "Colour and its Chemical Action." 3 p.m.

Edinburgh Architectural Association. — Visit to Tantallon Castle.

St. Paul's Ecclesiological Society.—Visit to the Battersea Churches of St. Mark, St. Peter, and St. Mary by the Park, under the direction of Mr. William White, F.S.A.

MONDAY, APRIL 21.

Royal Institute of British Architects.—Special General Meeting for Members only. 8 p.m.

TUESDAY, APRIL 22.

Institution of Civil Engineers.—Discussion on Sir Frederick Bramwell's paper on "The Application of Electricity to Welding, Stamping, and other Cognate Purposes." 8 p.m.

Society of Arts (Foreign and Colonial Section). — Sir J. Stokes, on "The Danube and its Trade." 5 p.m.

WEDNESDAY, APRIL 23.

Society of Arts.—Mr. W. Whitaker, F.R.S., on "Coal in the South-east of England." 8 p.m.

Sanitary Institute.—Address by Sir Robert Rawlinson, who will present the Medals and Certificates awarded to the successful Exhibitors at the Exhibition held at Worcester in 1889. 8 p.m.

Liverpool Engineering Society.—(1) Nomination of Council and Officers for ensuing Session. (2) Adjourned Discussion on Mr. T. L. Miller's paper on "The Efficiency of Gas-Engines." 8 p.m.

THURSDAY, APRIL 24.

Guild and School of Handicraft.—Mr. Stirling Lee on "A Talk on Sculpture." 8 p.m.

Institution of Electrical Engineers.—Dr. Oliver Lodge, F.R.S., on "A Lightning Guard for Telegraph Purposes and the Protection of Cables from Lightning." 8 p.m.

FRIDAY, APRIL 25.

Institution of Civil Engineers (Students' Meeting).—Mr. C. F. Jenkin on "Some Applications of Electricity in Engineering Workshops." 7.30 p.m.

SATURDAY, APRIL 26.

Association of Municipal and Sanitary Engineers and Surveyors. — Home District Meeting at Acton, Ealing, and Hampton.

Royal Institution.—Captain W. de W. Abney, F.R.S., on "Colour and its Chemical Action. II. 3 p.m.

Miscellanea.

Robert Boyle & Son (Limited).—The directors of Robert Boyle & Son, Limited, ventilating engineers, London and Glasgow, have resolved to pay an instalment on account of dividend at the rate of 12 per cent. per annum for the half-year ending March 31 last, which is stated to have been the most prosperous since the formation of the Company. The directors attribute this success to the great and ever-increasing demand for the latest improved form of their self-acting "Air-Pump" ventilator, upon which further improvements have recently been effected by Mr. Robert Boyle, adding considerably (so we are informed) to its power as an exhaust ventilator, weatherproof and free from down-draught. It is now made of a more ornamental character, of the best rolled steel-plates, galvanised, and painted with enamel paint, and, though superior to those Messrs. Boyle have hitherto made, is sold at 50 per cent. less in price, and it is claimed that it is not only the most efficient but also the most substantially-made and cheapest ventilator in the market. The Company have just applied their system of ventilation to the Lord Mayor's Court, Guildhall, H.M.S. *Conquest*, the new "White Star" line steamers *Teutonic* and *Majestic*, and the new steamer of the Compagnie Générale Transatlantique, *La Touraine*. The Company have at present some very important ventilating contracts in hand and in prospect. Mr. Robert Boyle, the managing director, is now in India, arranging contracts for Government buildings and establishing "agencies," after which he proceeds to China and Japan.

University College, London.—A series of Saturday morning lectures on "Architecture; Classic and Christian," intended for art students and others, and open to ladies, will be commenced by Professor T. Roger Smith, F.R.I.B.A., on Saturday, April 19, at 11 a.m. The following is the syllabus:—Classic Architecture (three lectures and one visit): The nature of architecture; the origins of Greek architecture; Greek archaic buildings; temples; public buildings; parallel between Greek and Roman art; Roman temples; public and domestic buildings; monuments; Basilicas; visit to the British Museum. Christian Architecture (three lectures and one visit): Byzantine and Romanesque architecture; Gothic architecture in England; the usual division into periods; cathedrals, churches, and monastic buildings in England; domestic and military buildings; Gothic architecture in France, Germany, and Italy; visit to Westminster Abbey. The lectures will be fully illustrated by diagrams and photographs. The fee for the course is one guinea, admission to the first lecture being free.

The "Marlborough" Patent Pamphlet Cases.—We have previously noticed these admirable cases for preserving loose pamphlets, periodicals, &c. We have now received a specimen of the case which has been prepared specially for containing numbers of the *Builder*. Messrs. Marlborough, Gould, & Co., of Old Bailey, are the manufacturers, but the cases may be had to order from all stationers and booksellers. The cases are very convenient. They facilitate order and tidiness, and help greatly in the classification of loose pamphlets and periodicals, dust and "blacks" being effectually excluded. They are made in sizes to suit all magazines and periodicals.

The English Iron Trade.—The English iron market is very quiet, with a general downward movement in prices. Business in pig-iron is of a very restricted nature. Consumers are holding back in the expectation of still lower prices, while producers are unable to sell at the reduced rates, owing to the dearness of raw material, the business done passing almost exclusively through the hands of merchants and holders of warrants. The Glasgow and Middlesbrough warrant markets have been on the downward course all the week. Scotch warrants are about 2s. a ton lower, and Cleveland warrants as much as 6s. The drop in Scotch makers' iron ranges from 6d. to 5s. per ton, and in Cleveland makers' iron it is 5s. a ton. Lancashire pig-iron has lost 2s. a ton, Lincolnshire 1s., and Derbyshire 5s. Other descriptions of pig-iron have experienced a corresponding fall, while West Coast hematites are obtainable at prices 5s. below those ruling a week ago. The demand for manufactured iron and steel continues very limited, and prices have further declined. The decline in finished iron is from 2s. 6d. to 5s. a ton, and in steel from 2s. 6d. to 15s. Shipbuilders, although pretty well engaged on work in hand, are not booking any fresh orders. Engineers are taking some new work, but they are quieter on the whole.—*Iron.*

Proposed Artisans' Dwellings.—On Tuesday next, at the Mart, the London County Council will offer for sale some lands lying east and west of Rosebery-avenue. The two lots, being about 41,150 feet superficial together, abut against that portion of the new street from Gray's Inn-road to St. John-street-road which is now nearly completed. They will be utilised for artisans' dwellings, to be constructed in accordance with plans to be approved by the Council. It is required that the dwellings shall accommodate 660 persons of the "labouring-class" as defined by statute, and shall be built for a least total of 20,500*l*. Their erection here is stipulated for by the Metropolitan Board of Works (Various Powers) Act of 1885, in terms whereof the late Board made a scheme in this behalf. At the part in question, Rosebery-avenue passes between Mount Pleasant and Clerkenwell-road, and is carried upon a viaduct of brick arches, crossing Warner-street by a girder-bridge. The height of the footway above the lowest point of the hollow is 27 ft. The two lots are traversed, at a depth of about 18 ft., by the Old Fleet sewer, which here forms a boundary between the parishes of St. Andrew, Holborn, and St. James' and St. John, Clerkenwell. The stream ran along the northern sides of the present Poole's-buildings, on Mount Pleasant, and the Field-land Refuges in Vine-street.

Copping's Automatic Sash-lock.—This sash fastener, of which a working model has been submitted to us, is one of the best recent patents of this kind that has come under our notice. A small barrel bolt, fixed in a strong sheath on the rail of the inner sash, shoots with a spring into a brass socket fixed on the rail of the outer sash; the socket is combined with a striking-plate which automatically pushes back the bolt on closing the window, until it is opposite the socket. The bolt works at right-angles to the sash-rails. Combined with the bolt are a couple of clips on the inner sash sliding on a brass bed on the outer sash which slopes obliquely, so that, on meeting, the sash-rails are drawn together and held tight. The bolt is withdrawn by a drop-ring on the inner side. As we have observed in former instances, a spring is always a certain element of weakness; but in every other respect this is an excellent and workmanlike fastener, good in principle and very strongly made, and we commend it to the attention of architects.

The Æolus Waterspray System of Ventilation.—It will be seen from our advertising columns that Messrs. Baird, Thompson & Co., ventilating and sanitary engineers, of Queen Victoria-street and Glasgow, have purchased the patent rights and plant of the Æolus Waterspray General Ventilating and Electrical Engineering Company, together with the goodwill of the business carried on by that company. The Æolus Waterspray System of Ventilation has been largely applied on the Continent of Europe, where many important Government and other buildings have been ventilated by it. In Canada and Queensland it has been applied to the Government Offices; while in this country many important buildings have been heated and ventilated by the company.

Registration of Plumbers at Plymouth.—The Mayor of Plymouth presided, on the 10th inst., over a public meeting held in the Municipal Buildings, Plymouth, in furtherance of the national system for training and registration of plumbers. There was a large and influential attendance.—The Mayor opened the proceedings by introducing the Master of the Worshipful Company of Plumbers, Mr. W. H. Bishop, who said that Plymouth was very rapidly growing, and in the race between seaside places for public favour as health resorts there was no reason why it should not take the front rank. The subject of sanitation was an eminently practical one, and was pressing itself on the public attention more and more every day. He said that the Company's object was not confined to the registration of competent men; they were doing their utmost to provide the younger members of the craft with facilities for rendering themselves competent, and he referred to the rapid spread of technical classes in various parts of the kingdom. The men who attended those classes showed by their study and application to the work during three hours of voluntary schooling a determination to improve themselves and their trade which could not fail to ultimately succeed. Referring to the way in which the movement was being carried out, he said they were met there in public to elect a Council composed equally of each section of the plumbing trade, and representatives of the public. With a body so constituted, surely it would be hard to find fault. They would draw up their by-laws, fix the time and place of their meetings, and prepare for examinations; for the feeling throughout the country was growing stronger every day that applicants for registration should be admitted on examination only.—The Earl of Morley moved that a Council be formed at Plymouth to carry out the registration system in South Devon and Cornwall.—Several other speakers having warmly supported the resolution, it was carried unanimously, and a District Council elected, including, besides the representatives of the master and operative plumbers, the following public representatives:—The Mayor of Plymouth, the Mayor of Devonport, Dr. Greenway (Medical Officer, Plymouth), Dr. Lear (Medical Officer, Stonehouse), Dr. W. May (Medical Officer, Devonport), Dr. Kerswill (Medical Officer, St. German's Union), Dr. Prance, Dr. Hingston, Dr. J. H. S. May, Messrs. C. King, F. Hine, W. Snell, and Luff (architects), J. Bellamy (Borough Surveyor, Plymouth), W. Burns (Borough Surveyor, Devonport), and A. E. Lyons (Chairman, Stonehouse Local Board). The Mayor of Plymouth presented Certificates of Registration granted by the Plumbers' Company to a number of local plumbers who had passed the examinations, and the proceedings ended with the usual votes of thanks.

Association of Municipal and Sanitary Engineers and Surveyors.—A Home District meeting of this Association will be held on Saturday, April 26, 1890, at Acton, Ealing, and Hampton. The members will proceed to the sewage works of the Acton Local Board, on the morning of the 26th inst., by railway to either Turnham Green Station (Metropolitan Railway), or Acton Station (North London Railway), from each of which stations the works are about three-quarters of a mile distant. The programme of the meeting will be as follows, viz.:—11 a.m. Assemble at sewage works of Acton Local Board, where a short paper descriptive of the process of the International Rivers Purification Co. will be read by Mr. Ebbetts, Surveyor of Acton, and the works afterwards inspected. 12 noon: Proceed by breaks to Ealing. 12.20 p.m.: Arrive at Ealing, where a paper descriptive of the new Public Offices and other recent works at Ealing will be read by Mr. Jones, and an inspection made of the Baths, Offices, Free Library, Fire Brigade Station, stabling, &c. 1.30 p.m.: Light refreshments will be provided by Messrs. Jones and Robson at the Public Offices, Ealing. 2.30 p.m.: Proceed by breaks to Hampton, where by the kind permission of Mr. Fraser, the large Extension Works of the Grand Junction Waterworks Co. will be viewed, including special pumping machinery now in course of erection.

Surveyorship, Luton.—We understand that the Town Council of Luton have appointed Mr. E. J. Lovegrove, A.M.I.C.E. (Assistant Borough Engineer and Surveyor of Croydon), as Borough Engineer and Surveyor. Mr. Lovegrove is the son of Mr. Jas. Lovegrove, C.E., Surveyor to the Hackney District Board of Works.

Edinburgh Architectural Association.—The usual fortnightly meeting of this Association was held on the 9th inst. in the Architectural Hall, 42, George-street, Professor G. Baldwin Brown, President, in the chair. After the usual preliminary business, a paper on "The Accessories of Architecture" was read by Mr. John Keppie, President of the Glasgow Architectural Association. The subject of site, which is one of the most important with which the architect has to deal, and which in a great number of instances does not receive the attention it deserves, was the first accessory to which attention was drawn. Comparison was made between the setting-out of cities in Britain and on the Continent, considerably to the advantage of the latter. Paris particularly was alluded to as a city in which most of the fine buildings were beautifully situated, and the lecturer said that consequently they received a much greater degree of public appreciative attention. Sculpture and metal-work were next alluded to as valuable aids to the architect, not only on account of fine form, but of the texture and coloration of which they were capable, and which was as valuable in architecture as in painting. Some remarks were made on the correct method of designing in different materials, such as cast-iron, plaster, &c. The lecturer said, in conclusion, that, owing to the increase of interest in the various accessories, these arts were now in a more flourishing condition than they were fifty years ago, and consequently architecture ought now to be, if it was not, more interesting and thorough than it was then.—At the close, a hearty vote of thanks was accorded to the lecturer.

Lifts.—Messrs. Archibald Smith & Stevens have received instructions to erect one of their "Reliance" hydraulic lifts at the Badminton Club-chambers. They are also erecting similar lifts at Ashley-mansions, Victoria-street, Westminster; and in several other buildings.

Building Land at Northwood.—We may call the attention of our readers to the sale of freehold building land to be held at Northwood, on the borders of Middlesex and Herts, on the 30th inst., by Messrs. Humbert, Son, & Flint, as advertised.

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ....ton	6	15	0	7	5	0
Teak, E.I. ....load	11	0	0	14	0	0
Sequoia, U.S. ....foot cube	0	2	3	0	3	0
Ash, Canada ....load	3	0	0	4	5	0
Birch ,, ...	3	0	0	5	0	0
Elm ,, ...	3	10	0	4	15	0
Fir, Dantsic, &c.	2	0	0	3	10	0
Oak ,, ...	2	10	0	4	10	0
Canada	5	10	0	6	10	0
Pine, Canada red	2	10	0	3	10	0
,, yellow	2	0	0	5	5	0
Lath, Dantsic ....fathom	5	0	0	6	0	0
St. Petersburg	5	0	0	7	10	0
Wainscot, Riga, &c. ....log	0	0	0	0	0	0
Deals, Finland, 2nd and 1st. std. 100	8	0	0	11	0	0
,, ,, 4th and 3rd	7	0	0	7	10	0
Riga	7	0	0	8	10	0
St. Petersburg, 1st yellow	10	0	0	14	0	0
,, 2nd ,, ...	8	0	0	10	0	0
,, white	6	10	0	10	0	0
Swedish	7	10	0	15	10	0
White Sea	8	0	0	17	0	0
Canada, Pine, 1st	15	0	0	26	0	0
,, ,, 2nd	10	10	0	17	0	0
,, ,, 3rd, &c.	7	0	0	10	0	0
,, Spruce, 1st	8	15	0	11	0	0
,, ,, 3rd and 2nd ..	6	15	0	8	10	0
New Brunswick, &c.	6	0	0	8	10	0
Battens, all kinds	6	0	0	16	0	0
Flooring Boards, sq., 1 in., prepared, First	0	11	0	0	14	0
Second	0	8	0	0	10	6
Other qualities	0	6	0	0	7	9
Cedar, Cuba ....foot	0	0	4	0	0	4½
Honduras, &c.	0	0	4	0	0	4½
Mahogany, Cuba	0	0	4½	0	0	6½
St. Domingo, cargo average ..	0	0	4½	0	0	6½
Mexican, cargo average	0	0	4½	0	0	5½
Tobasco ,, ...	0	0	5½	0	0	6½
Honduras ,, ...	0	0	5½	0	0	6½
Box, Turkey ....ton	4	0	0	13	0	0
Rose, Rio	15	0	0	20	0	0
Bahia	14	0	0	18	0	0
Satin, St. Domingo ....foot	0	0	6	0	1	3
Porto Rico	0	0	10	0	1	3
Walnut, Italian	0	0	4½	0	0	7
METALS.						
IRON—Bar, Welsh, in London tn	8	2	6	8	10	0
,, ,, at works in Wales	7	15	0	8	0	0
,, Staffordshire, in London ..	8	10	0	9	10	0
COPPER—British, cake and ingot	53	0	0	53	10	0
Best selected	55	0	0	56	0	0
Sheets, strong	62	0	0	0	0	0
Chili, bars	48	0	0	0	0	0
YELLOW METAL ....lb.	0	0	5½	0	0	6
LEAD—Pig, Spanish ....ton	12	11	3	12	12	6
English, com. brands	12	15	0	0	0	0
Sheet, English	14	10	0	0	0	0
Pipe	15	0	0	0	0	0
METALS (*continued*).	£.	s.	d.	£.	s.	d.
TIN—Straits	88	10	0	0	0	0
Australian	89	0	0	0	0	0
English Ingots	93	0	0	0	0	0
OILS.						
Linseed ....ton	23	2	6	23	7	6
Cocoanut, Cochin	28	10	0	0	0	0
Cocoanut, Ceylon	25	5	0	0	0	0
Palm, Lagos	24	10	0	24	15	0
Rapeseed, English pale	32	0	0	32	5	0
,, brown	30	10	0	0	0	0
Cottonseed, refined	22	0	0	0	0	0
Tallow and Oleine	21	0	0	40	0	0
Lubricating, U.S.	5	10	0	6	0	0
,, refined	7	0	0	12	0	0
TAR—Stockholm ....barrel	1	5	6	0	0	0
Archangel	0	16	9	0	0	0

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

ABINGDON.—For the erection and completion of Salvation Army Fortress, Abingdon, for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C.:—

E. Williams, Abingdon	£546 0 0
Ellwood & Sons, Sandy	497 0 0
S. Drew, Abingdon	490 0 0
T. Barrett, Abingdon	455 0 0
J. Buckle, Abingdon	448 0 0
G. H. Wheeler, Abingdon	437 0 0
Martin & Barclay, Battersea	430 0 0

ANSTEY (near Dorchester).—For the erection of a pair of semi-detached villas, for Messrs. Hall & Woodhouse. Mr. A. L. T. Tilley, architect, Dorchester:—

W. House, Hurtfoot Lane (accepted).	£786 0 0

BROADSTAIRS (Kent).—For erecting a Convalescent Home, for the Board of Managers of the North Surrey District Schools, Anerley. Mr. A. G. Hennell, architect, Forest Hill. Quantities supplied by Mr. J. R. Vining, 89, Chancery-lane, W.C.:—

H. L. Holloway	£4,290 0 0
A. G. Lockwood & Co.	3,756 0 0
W. Johnson	3,699 0 0
J. T. May	3,690 0 0
Foster & Dicksee	3,681 0 0
W. & T. Denne	3,680 0 0
Holloway Bros.	3,670 0 0
Charles Home	3,595 0 0
R. G. Battley	3,574 0 0
W. Akers & Co.	3,570 0 0
J. Shillitoe & Son	3,500 0 0
F. J. Coxhead	3,439 0 0
W. H. Port	3,400 0 0
W. J. Adcock	3,397 0 0
C. J. Slade	3,395 0 0
T. Pearce	3,353 10 0
F. J. Doughty	3,283 0 0
J. Longley & Co.	3,223 0 0
W. W. Martin	3,149 0 0
Robeson & Rickett	3,139 0 0
J. Pocock	3,133 0 0
Andrew Black & Son	3,128 0 0
L. Shrubsole	3,095 0 0
G. H. Denne & Son	3,088 0 0
J. Brown & Son (accepted)	2,933 0 0

BROADWELL (Gloucestershire).—For new wing and alterations, at Broadwell, Gloucestershire, for Mr. R. G. Francis. Mr. E. Guy Dawber, architect:—

Hookham, Stow-on-the-Wold	£699 0 0
Groves, Milton-under-Wychwood	587 0 0
Howman Bros., Stow-on-the-Wold ..	510 0 0

BURTON-ON-TRENT.—For the erection of new malthouse, avenue, hop and barley stores, and other works, at Clarence-street Brewery, Burton, for the trustees of the late Mr. P. Walker. Mr. Robey E. Carpenter, architect, Burton. Quantities by the architect:—

Wood, Derby	£6,465 0 0
Hunter, Burton	6,440 0 0
Walker & Slater, Derby	6,345 0 0
Hodges, Burton	6,200 0 0
Chamberlain, Burton	6,195 0 0
Lowe & Sons, Burton	6,100 0 0
Varlow, Burton (accepted)	5,997 0 0

[Architect's estimate, £6,250.]

COLCHESTER.—For erecting new schools, Kendall-road. Mr. Frank Whitmore, architect, Chelmsford:—

F. S. Ward	£1,490 0 0
F. Dupont	1,393 0 0
Everett & Son (accepted)	1,389 0 0

[All of Colchester.]

EASTBOURNE.—For the erection and completion of Salvation Army Citadel buildings in Eastbourne, Sussex, for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C.:—

J. Peerless, Eastbourne	£2,625 0 0!
L. Huggett, Eastbourne	2,486 17 8
J. Coster, Eastbourne	2,250 0 0
J. Pinall, jun., Eastbourne	1,979 10 0
E. Cornwell & Son, Eastbourne	1,850 0 0
Rowland Bros., Horsham	1,749 0 0
Coxhead, Leytonstone	1,679 0 0
W. Backhurst, Eastbourne	1,569 0 0
F. Mitchell, Bexhill-on-Sea	1,557 0 0
Martin & Barclay, Battersea	1,385 0 0!

EAST BRENT (Somersetshire).—For the first portion of the work to be done at the parish church, for the Ven. Archdeacon Denison. Mr. E. H. Lingen Barker, architect:—

Jones & Willis	£690 0 0!
Midland Joinery Co.	517 12 0
Goss	400 0 0
Hems	380 0 0
Kimberley	365 0 0
Cowlin	349 0 0
Pollard	345 0 0
Hawkins & Co.	293 19 0
Merrick	268 17 0
Dart (accepted)	240 0 0!

COMPETITION, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITION.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page
Plans for Schools	North Wales University College	Four of 20 Guineas	April 23rd	ii.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Pipe Sewers, &c.	Lewisham Bd. of Works	*Official*	April 22nd	ii.
Road Materials	do.	do.	do.	ii.
Repair of Pitching, Caledonian-road	St. Mary (Islington) Vestry	do.	do.	xiii.
Tarpaving of Paths, Barnsbury	do.	do.	do.	xiii.
Roadmaking Works, Tunbridge Wells		B. Pomfret	April 24th	xi.
Twenty Cottages, Parkston	G. E. Ry. Co.	*Official*	April 25th	ii.
Depot and Store, Upper Thames-street	Com. of Sewers	do.	do.	ii.
New Outlet Sluice	Essex Sewers Com.	G. Hickman Barnes	April 26th	xi.
Making-up Road, Rochester	The Owners	W. Banks	do.	xi.
Painting, Whitewashing, Repairs, &c.	St. Marylebone Guar.	*Official*	April 28th	xi.
Construction of Mixing House, &c. (Sewage Works)	West Ham Council	Lewis Angell	April 29th	xi.
Broken Granite	Hackney Bd. of Wks.	Jas. Lovegrove	April 30th	xiii.
Street Works	Sevenoaks Local Board	Jabez Mann	do.	xi.
Furnishing Vestry Hall and Offices	Fulham Vestry	G. Edwards	do.	xiii.
Roadmaking and Paving Works	do.	W. Sykes	do.	xiii.
Extension of Schools	Burton-on-Trent Sch. Bd	R. Churchill	do.	ii.
Underground Urinal	Greenwich Bd. of Wks.	*Official*	do.	xi.
Widening of Line, Twyford and Reading	G. W. Ry. Co.	do.	do.	xi.
Cast-iron Water-pipes	Calcutta Corporation	J. Quick & Son	May 1st	xiii.
Iron Staircases	St. Mary (Islington) Guardians	W. Smith	do.	xi.
Main Storm-water Drains	Billesdon U.R.S.A.	J. B. Everard	May 2nd	xi.
Roadmaking and Paving Works	do.	W. F. Ault	do.	xi.
Postmen's Office, Wandsworth	Com. of H.M. Wks. &c.	*Official*	do.	ii.
Post-office, Woolwich	do.	do.	do.	ii.
Parcel Sorting Office, Manchester	do.	do.	May 6th	ii.
Widening in Iron and Steel of Viaducts, Bristol Station	G. W. & M. Ry. Co.'s	do.	do.	ii.
Cartage, &c.	Chiswick Local Board	A. Ramsden	May 7th	xi.
Road Materials	Norfolk County Council	T. H. B. Heslop	May 8th	xi.
Poor Asylum, Isle of Man			May 24th	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Assistant Surveyors (R.E. Dept.)	Civil Service Commission	Not stated	April 26th	xvi.
Surveyor	Worksop Local Board		April 28th	xvi.

FINCHLEY.—For erecting coach-house and stables, in Torrington Park, North Finchley. Mr. F. D. Thomson, architect, The Oaks, Woodside Park, N. :—

Wheeler & Co. (accepted)	£303 0 0

FINCHLEY.—For repairs, &c., to two houses in Torrington Park, North Finchley. Mr. F. D. Thomson, architect :—

Clarke	£193 14 0
Dixon	182 10 0
Wheeler & Co.	150 16 0
Voller	148 0 0

FINCHLEY.—For repairs, &c., to Congregational Church, North Finchley. Mr. F. D. Thomson, architect :—

Clarke	£275 10 0
Dixon	275 0 0
Voller	274 12 0
Wheeler & Co.	239 14 0

FOREST GATE.—For new banking premises and shop, Forest Gate, for the London and South-Western Banking Co., Limited. Mr. Edward Gabriel, architect, 42, Old Broad-street. Quantities by Mr. G. R. Tasker, 33, John-street, Bedford-row, W.C. :—

S. J. Scott	£8,318 0 0
G. Bryon	8,297 0 0
Killby & Gayford	8,275 0 0
Patman & Fotheringham	8,080 0 0
W. Shepherd	7,875 0 0
Cox	7,874 0 0
Smith & Son	7,777 0 0
W. Gregar	7,339 0 0
J. Godfrey & Son	7,287 0 0
G. Sharp (accepted)	7,200 0 0

HORNSEY.—For new road, sewer, surface water drain, connexions, &c., for the British Land Company, Limited, on their estate at Harringay Park. Mr. Henry B. Michell, Surveyor :—

Nowell & Robson, Kensington	£1,700 0 0
Dunmore, Crouch End, N.	1,529 0 0
Wilson, Walthamstow	1,497 0 0
Pizzey, Hornsey, N.	1,476 0 0
Peill & Sons, Bromley	1,453 0 0
Bloomfield, Tottenham	1,367 0 0
Jackson, Leyton (accepted)	1,255 0 0

KINGSTON.—For alterations and additions to "Fairnihirst." Mr. T. Searancke Archer, architect :—

Colls & Son	£2,244 0 0
Adkins	2,106 0 0
Sweet & Loder	2,100 0 0
Lansdowne	2,089 0 0
Holliday & Greenwood	2,088 0 0
E. Lawrence & Sons	1,979 0 0
Ansell	1,970 0 0
Joseph Higgs	1,957 0 0
William Shurmur	1,746 0 0

LONDON.—For rebuilding the "Plough" Inn, Mile-end-road, E. Mr. W. D. Church, architect, 12, South-place, Finsbury, E.C. Quantities by Messrs. C. Stanger & Son, surveyors, 21, Finsbury-pavement, E.C. :—

Hearle & Son	£7,327 0 0
W. & H. Lascelles	7,320 0 0
W. Harper	7,159 0 0
Higgs & Hill	7,152 0 0
Staines & Son	7,008 0 0
S. Salt	6,904 0 0
F. & F. J. Wood	6,726 0 0
G. Sharp	6,682 0 0
Holloway Bros.	6,648 0 0
J. Johnston	6,596 0 0
G. Todd	6,572 0 0
Harris & Wardrop	6,474 0 0
J. H. Johnson	6,458 0 0
W. Shurmur (accepted)	6,363 0 0

LONDON.—For alterations at St. James's Schools, Wandsworth Common, S.W., for the Guardians of the Westminster Union. Mr. Jno. Waldram, C.E., surveyor, 16, Craven-street, Charing-cross, W.C. :—

Lilley & Anderson, Wallington	£1,326 0 0
Doody, Eaton-square	962 0 0
W. Wallis, Balham	906 0 0
Johnson, Wandsworth	877 0 0
Lorden & Son, Upper Tooting	875 0 0
Parsons & Co., Wandsworth	870 0 0
Flew & Co., Kensington	839 0 0
A. Wallis, Balham	807 0 0
Marsland, Wandsworth	797 0 0
Johnson & Manners, Great Pulteney-street (accepted)	788 0 0
Hole, Sutton	757 0 0

LONDON.—For painting and other work at the Lambeth Infirmary, for the Guardians of the Poor of the parish of Lambeth. Quantities supplied :—

Godson & Son, Kilburn	£1,820 0 0 !
Cowper	1,520 0 0
Webb & Co.	1,487 0 0
Herridge, Brixton	1,460 0 0
Castle, Southwark	1,397 0 0
Furniss	1,359 13 0
Adcock	1,357 0 0
Warne & Co.	1,281 14 0
Ford	1,259 0 0
Hole	1,239 9 10
Waddington	1,197 0 0
Akers & Co.	1,191 0 0
Lilly, Whitcombe-street, W.C.	1,187 0 0
Batchelor, Maidstone	1,025 18 0
Preston	970 0 0
Whythe & Son, Clapton, E.	944 13 0
McDonald & Co.	909 0 0
G. W. Stewart & Co., Walworth-rd.	885 19 0
R. Seed, Chiswick, W.	877 0 0
McCarthy, Chelsea, S.W.	775 0 0 !

LONDON.—For decorating and painting, &c., at 12, Carlton House-terrace, for Sir Savile Crossley, Bart., M.P. :—

C. Hindley & Sons (accepted)	£350 0 0

LONDON.—For the erection of one pair of semi-detached houses on the Frognal Mansion Estate, Hampstead (exclusive of mosaic floors, tile hearths, stoves, mantelpieces, painted glass, door furniture, painting, or papering). No quantities supplied. Mr. James Neale, F.S.A., architect and surveyor, 10, Bloomsbury-square, W.C. :—

	Corsehill Stone.	Monks Park Stone.
Langdale, Hallett, & Co., London	£6,500	
Holloway Bros.	5,420	£5,214
Garlick & Horton	5,395	5,193
Foster & Dicksee, Rugby	5,252	4,994
McCormick & Sons, London	4,387	4,198

LONDON.—For the erection of Clarendon Chapel and Schools, Clarendon-street, Camberwell New-road, S.E. Mr. George Baines, architect, 4, Great Winchester-street, E.C. Quantities by Messrs. G. E. Goodchild & Son, 81, Finsbury-pavement, E.C. :—

	Chapel and Schools.	Upper part Tower and Spire.
Holliday & Greenwood	£6,189	£290
B. E. Nightingale	6,182	279
F. & H. F. Higgs	6,120	300
F. Tarrant	5,983	262
R. G. Battley	5,957	297
F. J. Coxhead	5,598	255
W. Johnson	5,500	253
S. J. Jerrard	5,483	230
H. L. Holloway*	5,470	229

* Accepted at £4,962, exclusive of the upper part of tower and spire, boundary walls, and gates.

LONDON.—For constructing swimming-bath at the Licensed Victuallers' School. Mr. G. Treacher, architect :—

Allen & Son	£3,400 0 0
Holliday & Greenwood	3,120 0 0
Beal	3,120 0 0
Gould & Brand	3,079 0 0
Burman & Son	3,050 0 0
Mower & Son	3,015 0 0

LONDON.—For alterations at the "Good Intent" public-house, Cambridge-heath. Mr. Batts, architect :—

Hood	£1,310 0 0
J. & H. Cox	1,297 0 0
Blow	1,282 0 0
Mower & Son	1,275 0 0
Edwards	1,257 0 0

LONDON.—For alterations at the "Crooked Billet," Upper Clapton, for Mrs. Fairhead. Mr. Brown, architect, 21, Liverpool-street. No quantities :—

Hood	£793 0 0
Godfrey & Son	777 0 0
Mower & Son	713 0 0
Walker Bros.	690 0 0
J. Anley	690 0 0
S. Goodall	677 0 0

LONDON.—For additional workshops, 120, East-road, N., for Messrs. Dotteridge Bros. Mr. A. G. Collins, architect, 52, Finsbury-pavement. No quantities :—

Nixon	£218 0 0
J. Chessum & Sons	204 0 0
J. Godfrey & Son	194 0 0

LONDON.—For pulling down and rebuilding warehouse, No. 5, Heneage-lane, Bevis Marks, E.C. Mr. H. Percy Monckton, architect, 32, Walbrook, E.C. :—

J. Greenwood	£1,153 0 0
Harrison & Spooner	1,087 0 0
Turtle & Appleton	1,013 0 0
E. A. Roome (accepted)	845 0 0

LONDON.—For fittings and decorations to Oliphant's Restaurant, No. 5, St. Bride's-street, E.C., for Mr. W. Oliphant. Mr. Walter Graves, architect, Winchester House, Old Broad-street, E.C. :—

J. & S. Bowyer	£736 0 0 !
A. Siegmann	485 0 0
B. E. Nightingale	369 0 0
F. Sage & Co.	340 0 0
Pitman & Son (accepted)	238 0 0 !

LONDON.—For drainage and sanitary works at "Claremont," Alleyn Park, Dulwich, for Mr. G. A. Kino. Mr. Walter Graves, architect, Winchester House, Old Broad-street, E.C. :—

G. Shaw	£195 0 0
J. & S. Bowyer	185 0 0
B. E. Nightingale	168 0 0

LONDON.—For additions to laundry at Charlotte-place, Walworth, for Mr. T. B. King. Quantities by Messrs. Young & Brown, 5, Henrietta-street, Covent Garden :—

Downs	£469 0 0
Colls	435 0 0
Castle	397 0 0
Marsland, Wandsworth	377 0 0

LONDON.—For the re-instatement of office fittings at the International Headquarters of the Salvation Army, 101, Queen Victoria-street, London, E.C., for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C. :—

F. J. Coxhead, Leytonstone *	£1,107 2 4

* Accepted.

LONDON.—For renovations and decorations to Salvation Army Barracks in various parts of the country, for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C. :—

T. Morgan, Wood Green (accepted)	£2,144 0 0

LONDON.—For pulling down and rebuilding No. 2, High-road, Clapton, for Mr. Chalton :—

Todd	£1,048 0 0
Shurmur	794 0 0
Mower & Son	737 0 0
Cordell	685 0 0
Coxhead (accepted)	621 0 0
Hood	525 0 0

MAIDENHEAD.—For house and stables at Maidenhead Court. Mr. T. Searancke Archer, architect:—

Gibson	£2,545	8	6
Joseph Higgs	2,418	0	0
For Billiard-room.			
Joseph Higgs	£450	0	0

PETERBOROUGH.—For the erection and completion of three shops in Cowgate, Peterborough, for the Salvation Army. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C.:—

Martin & Barclay, Battersea	£2,850	0	0
W. Jellings, Peterborough	2,465	11	9
F. J. Coxhead, Leytonstone	2,247	0	0
J. Wenlock, Peterborough	2,150	0	0
D. Gray, Peterborough	2,040	0	0
Ellwood & Sons, Sandy	1,975	0	0
Solden Hipwell, Wisbech	1,948	0	0

REDHILL.—For the erection of Salvation Army Fortress at Redhill, Surrey, for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C.:—

Bushby, Reigate	£649	0	0
Coxhead, Leytonstone	555	0	0
Amos & Foad, Whitstable	535	0	0
Wright, Broadwater	500	0	0
Martin & Barclay, Battersea	470	0	0

REDHILL.—For alterations and decorations at Furze Hill Lodge, Redhill, for Sir Francis Truscott:—

Messrs. Charlwood Bros., East Grinstead (accepted)	£750	0	0

SANDIACRE (near Nottingham).—For the erection of a hotel, stabling, &c. Mr. T. W. Latham, architect, Sandiacre. Quantities by the architect:—

George Bastable	£1195	0	0
C. Youngman	1180	0	0
F. Perks & Son (accepted)	1119	5	5

SOUTHAMPTON. — For taking down New Place House, Southampton, and erecting new house and offices on the site. Mr. W. H. Mitchell, architect, Southampton:—

Udall, Southampton	£10,331	12	0
Dyer & Sons, Southampton	10,182	0	0
H. Stevens & Co., Southampton	9,876	0	0
Sanders, Southampton	9,770	0	0
W. R. & C. Light, Portsmouth	8,999	0	0
Bull, Sons, & Co., Limited, Southampton (accepted)	8,998	0	0

STOCKPORT. — For alterations and additions to premises situate in Short-street, Stockport, to form same into a Salvation Army Barracks for General Booth. Mr. J. Williams Dunford, architect and surveyor, 101, Queen Victoria-street, E.C.:—

Coxhead, Leytonstone	£829	0	0
Martin & Barclay, Battersea	826	0	0
Bateson, Heaton Norris (accepted)	789	0	0

TEDDINGTON.—For finishing, draining, and decorating two houses in Teddington Park-road, for Messrs. J. & H. Pullman:—

Stanway, Acton	£222	0	0
Slade, Twickenham	157	2	0
Eydmann, Chiswick*	142	0	0
Collinson, Teddington†	124	0	0

* Accepted.
† Without the drainage.

WANSTEAD (Essex).—For alterations and additions to Cann Hall and Downsell-road Schools. Messrs. Bressey & Liddon-Walters, architects:—

Norths Bros.	£3,170	0	0
Flaxman	2,896	0	0
Mundy	2,800	0	0
Allen & Sons	2,775	0	0
Coxhead	2,726	0	0
Reed	2,696	0	0
Barrett & Power	2,694	0	0
Holland	2,652	0	0
Dabbs	2,634	0	0
Catley, Leytonstone (accepted)	2,626	0	0

WHETSTONE.—For the erection of a house at Oakleigh Park, Whetstone, N., for Mr. W. B Passmore. Mr. Herbert Passmore, architect, 9, Cumberland-terrace, Regent's Park, N.W. Quantities by Mr. W. Ralph Low:—

John Grover & Son	£1,948	0	0
E. Laurence & Sons	1,925	0	0
James Smith & Son	1,857	0	0
R. Battley	1,839	0	0
Mattock Bros. (accepted)	1,811	0	0

WIVENHOE.—For the erection of new schools for 460 children, and alterations and additions to the present schools for boys, boundary walls, drainage, &c., for Wivenhoe School Board. Mr. J. W. Start, F.S.I., architect and surveyor, Cups Chambers, High-street, Colchester. Quantities by the architect:—

W. Bell & Sons, Saffron Walden	£5,527	0	0
John Saint & Sons, St. Ives	5,515	0	0
Harcourt Runnacles, Halstead	5,446	0	0
D. Mackenzie, Clacton	5,280	0	0
T. J. Ward, Colchester	5,260	0	0
Geo. Dobson, Colchester	5,080	0	0
D. Ellwood & Son, Sandy, Beds	5,045	0	0
John Reed, Plymouth	4,998	0	0
A. Diss, West Bergholt	4,985	0	0
C. E. Orfeur, Colchester	4,980	0	0
H. Plummer, Rattlesden, Suffolk	4,909	0	0
W. A. Chambers, Colchester	4,899	0	0
F. Dupont, Colchester (accepted)	4,790	0	0

WRACKLEFORD (Dorset).—For alterations and additions to Wrackleford dairy-house, for Mr. Alfred Pope, J.P. Mr. A. L. T. Tilley, architect, Dorchester:—

Davis & Son, Dorchester (accepted)	£519	0	0

Barry-road Congregational Church, East Dulwich.—Referring to the list of tenders for this job in our issue of the 12th inst. Messrs. Henry Everett & Son, of Colchester, write to say that the amount of their tender was £11,298, not £12,298, as printed.

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TO CORRESPONDENTS.

V. N.—H. & H. (generally speaking no doubt this is an undesirable kind of condition to make; but we do not know what special circumstances may have led to it in this case).—J. K. (hardly within our province).—C. B. B. (thanks).—A. C. U. (we are glad to hear it, but the case is of no public interest).—S. T. (too late, and also illegible).—C. F. K. (too late).—A. C. (too late).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

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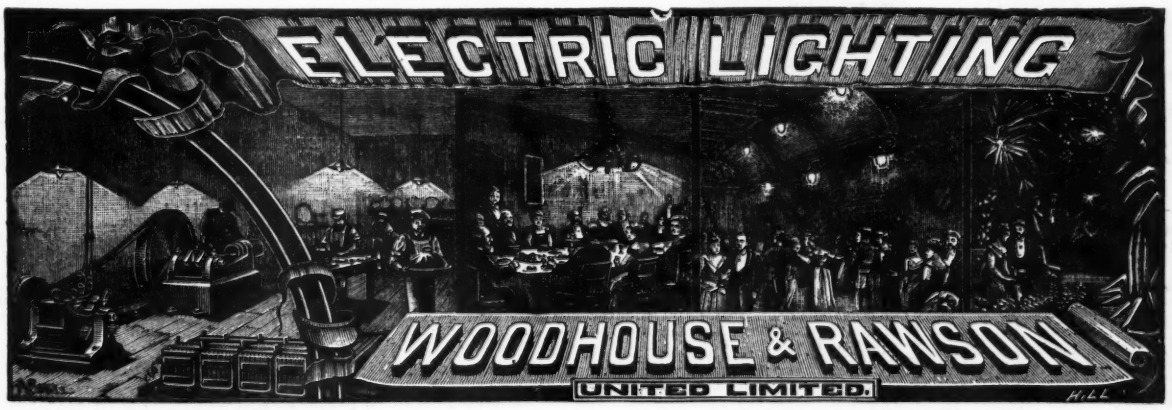

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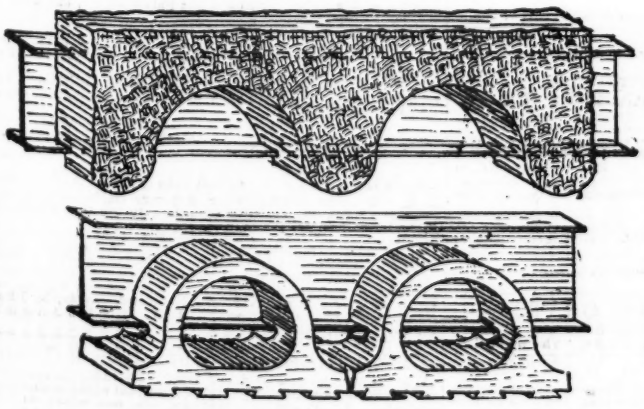

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The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent

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ARCHITECTURAL ASSOCIATION.

APRIL 26.—VISIT to ALBERT GATE MANSIONS. Messrs. ARCHER & GREEN, Architects. Meet at THREE p.m.

FRED. R. FARROW, { Hon.
ERNEST S. GALE, { Secs.

ARMOURERS' and BRASIERS' COMPANY. ART METAL EXHIBITION, 20th to 24th MAY, 1890. Intending Exhibitors are reminded that the last day for receiving entries is Monday, the 21st inst.

MARSHALL PONTIFEX, Clerk.
Armourers' Hall, 81, Coleman-street, E.C.

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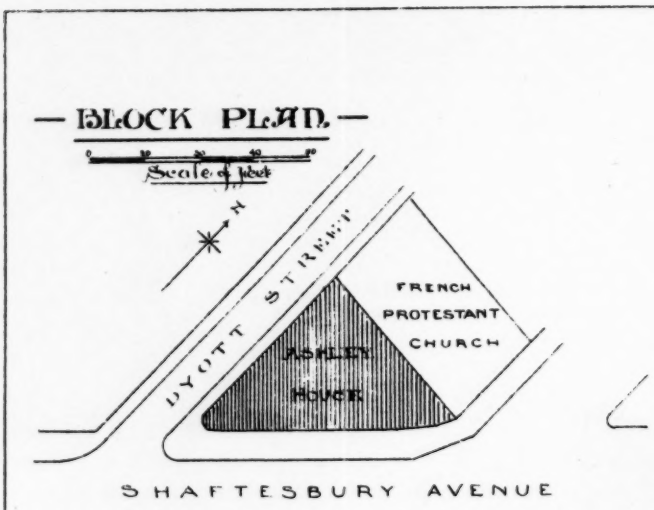

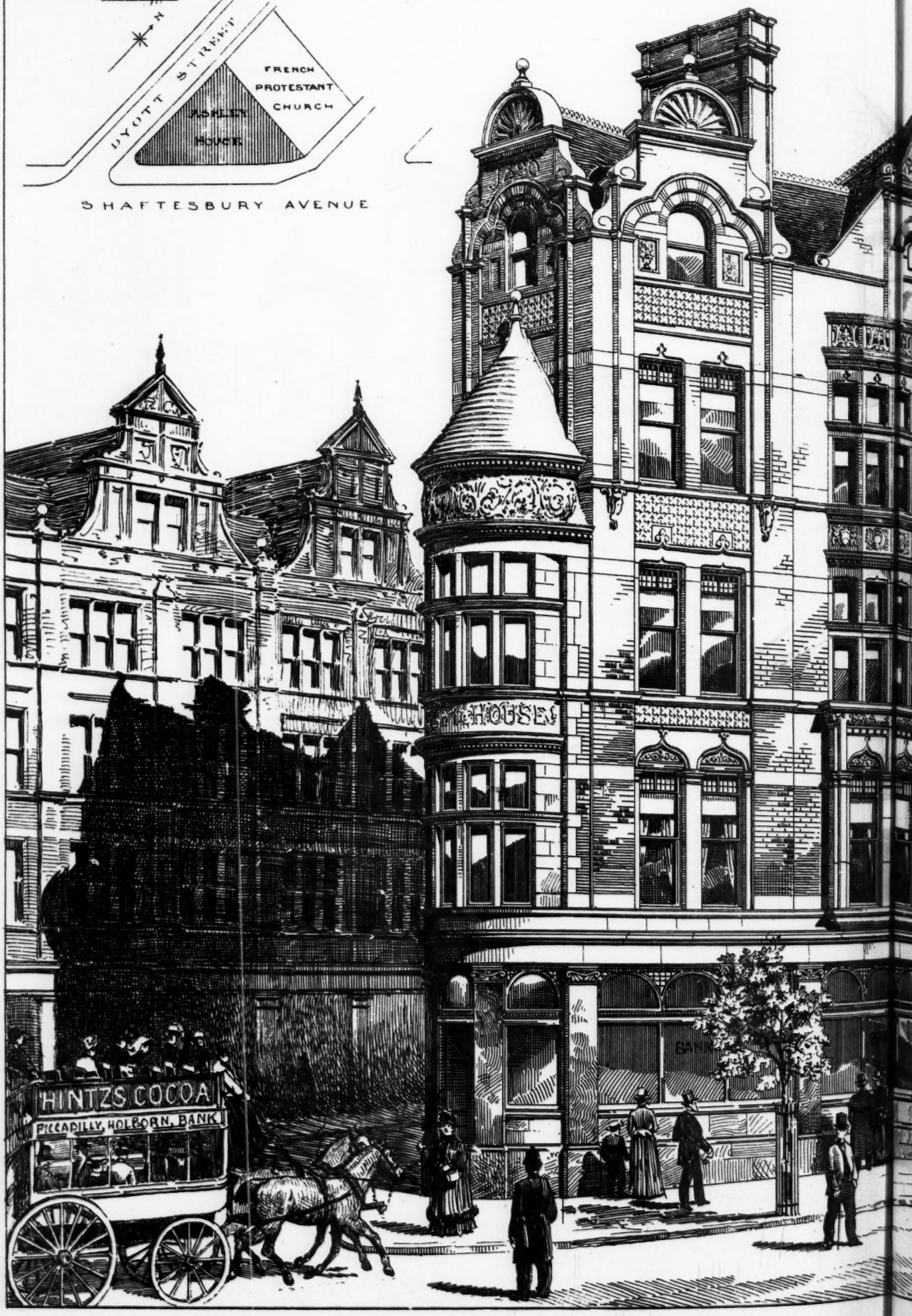

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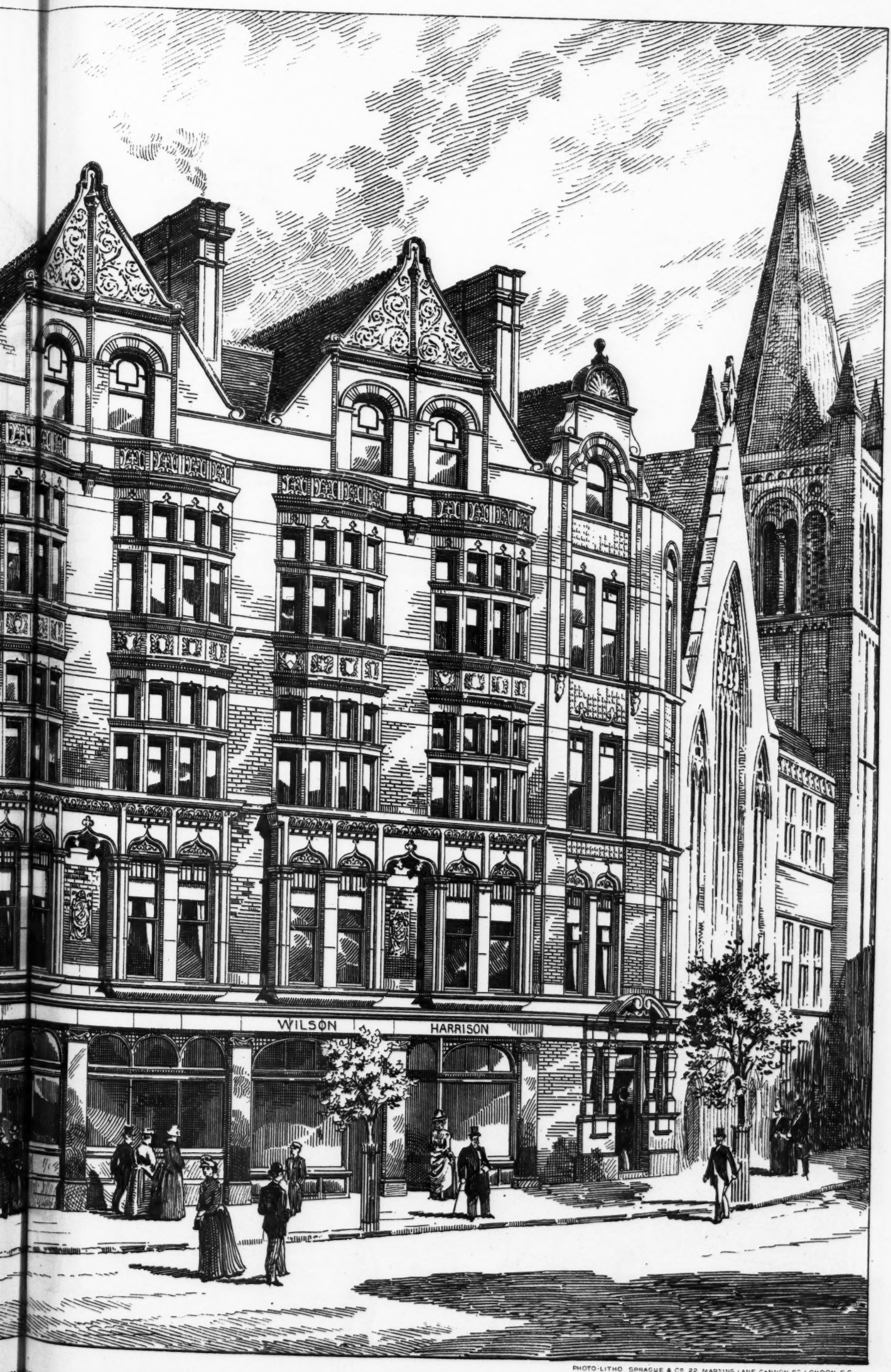

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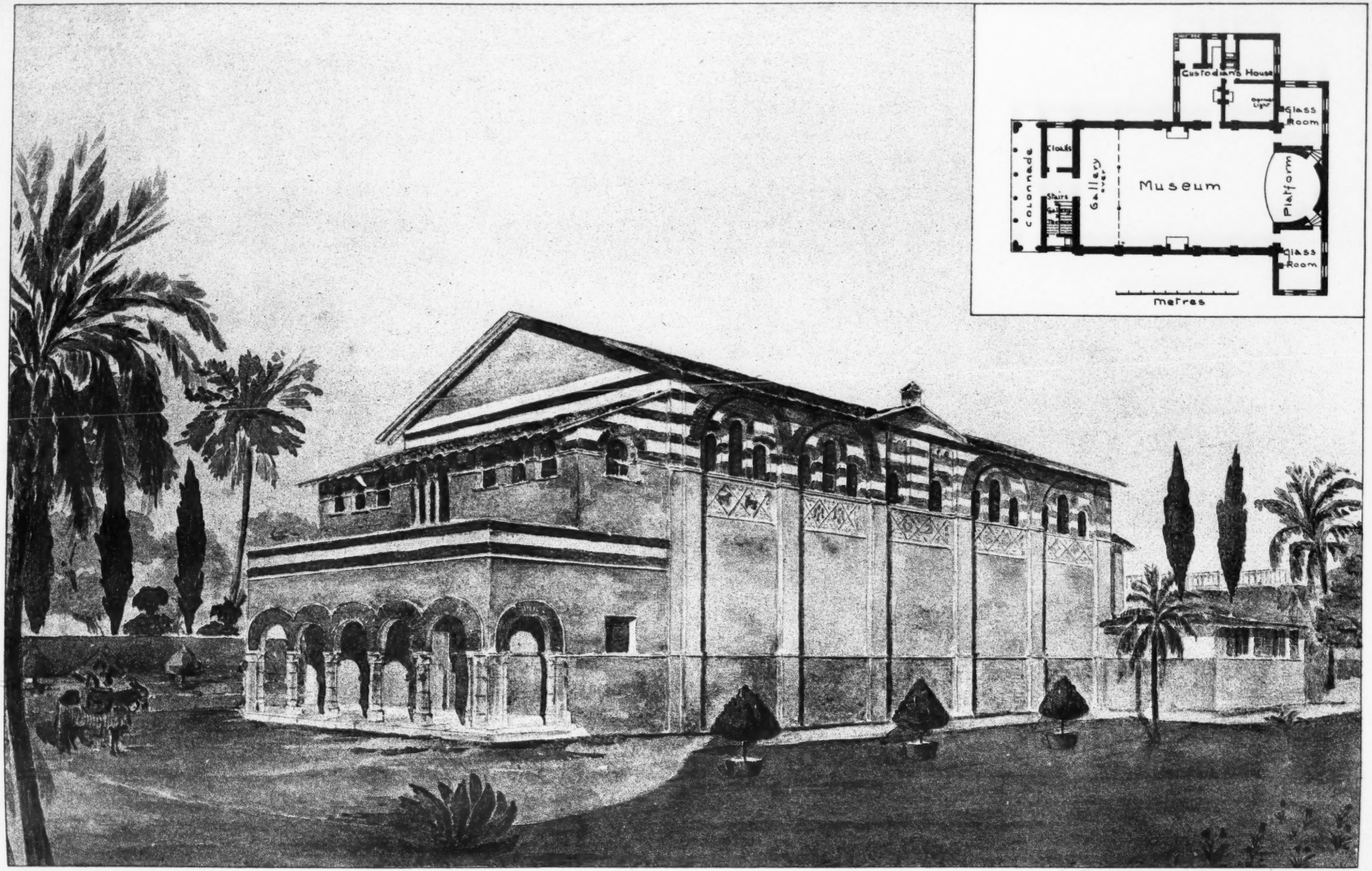

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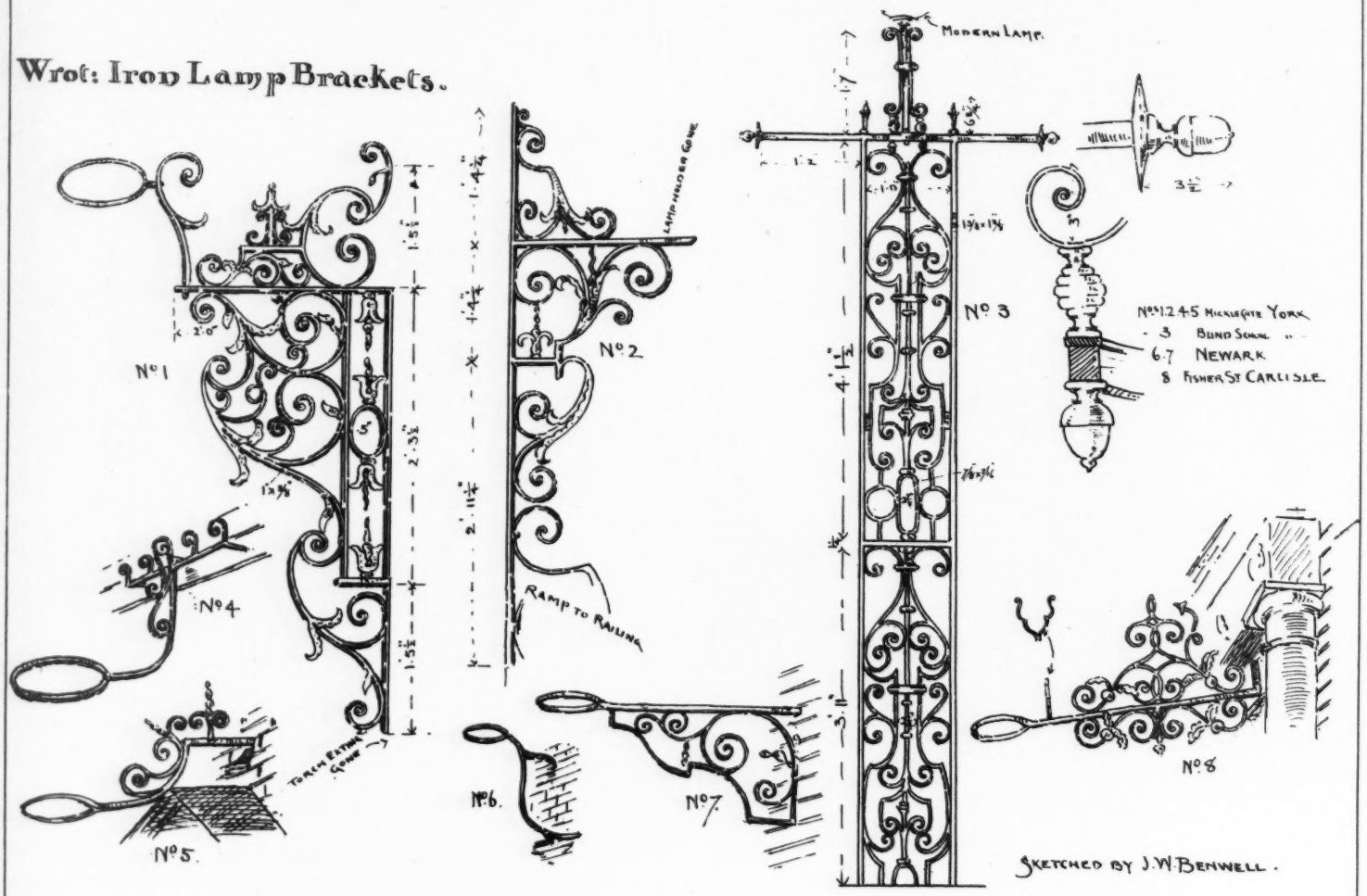

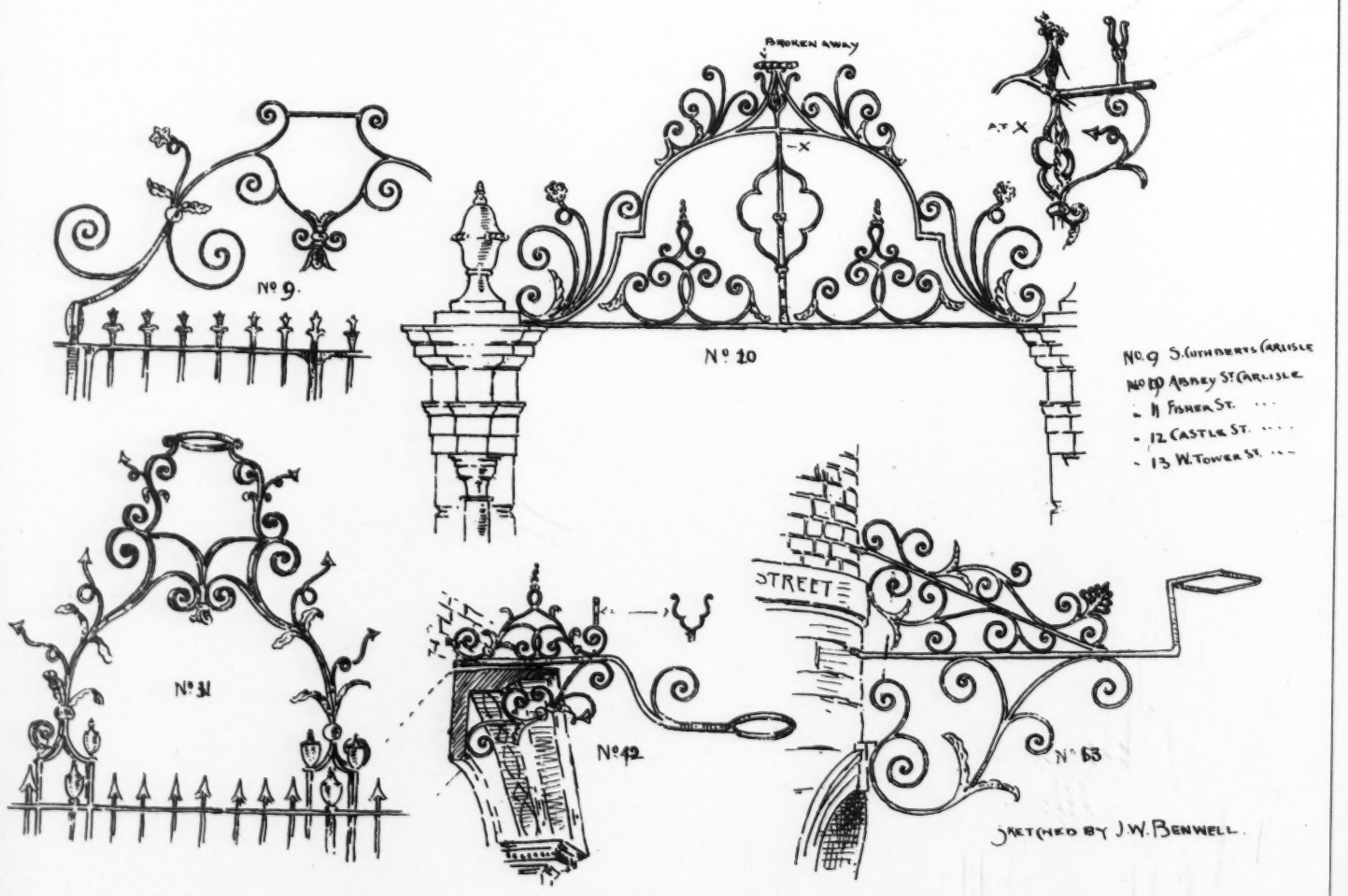

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